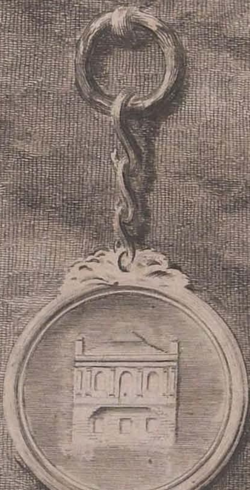
ANATOMY
OF THE
BONES MUSCLES
AND
JOINTS
BY
JOHN BELL
SURGEON



Engraved by IBeugo

Surgeon Royal

ENGRAVINGS,

EXPLAINING THE

ANATOMY

OF THE

BONES, MUSCLES, AND JOINTS.

BY

JOHN BELL, SURGEON.

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In a Book containing ſo many thouſand technical terms, it will not be particular though the Student ſhould find more to correct than what is here put down.—But theſe are ſome of the chief errata; and, ſince many of them affect the ſenſe, the Student ſhould touch them with the pen before he begins to read.

E R R A T A.

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4. *line* 7. *for* ſtretches *read* unites it.
8. *line* 1. *for* leſs *read* leſſer.
31. *line* 15. *for* 4 *read* 6.
35. *line* 13. *for* futures *read* future.
Ibid. line 13. *for* ſeparate *read* ſeparates.
Ibid. line 14. *for* Œthmoid *read* Clinoid.
54. *line* 20. for *d. d.* read *z. z.*
55. *line* 17. *for* Pubis *read* Iſchium.
69. *line* 22. *for* inner *read* outer.
72. *line* 7. *for* Radius *read* Humerus.
97 *line* 15. *for* cartilages *read* cartilage.
Ibid. lines 18, 19 *for* 44. 45. 46. *read* 54. 55. 56.
98. *line* 4. *for* ix. *read* x.
100. *line* 1. *for* Sterno-hyoideus *read* Sterno-thyroideus.
Ibid. line 22 *for* Arytenoideus obliquus *read* Arytenoideus lateralis
101. *line* 16. *for* Styloid muſcle *read* Styloid proceſs.

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110. *lin. ult. for* uncovered by the ſkin *read* uncovered of the ſkin.
119. *line* 7. *dele* Below the ſpine is ſeen the Infraſpinatus.
134. *line* 6. *for* where *read* whence.
146. *line* 14. for *d. d.* read *b. b.*
156. *line* 18. *for* iii. *read* iv.
159, *line* 2. *from foot, for* 188. *read* 186.
168. *line* 7. *for* Coraco brachialis *read* Biceps.
173. *line* 4. *for* wriſt *read* creſt.
174. *line* 7. *for* cancellæ *read* lamellæ.
175. *line* 6. for (*g*) read (9).
177. *line* 15. for (*m*) read (*n*).
Ibid. line 21. for (*s*) read (*m*).
190 *line* 2. *for* outer *read* inner.
Ibid. line 10. *dele* often.
191. *line* 4. *for* ſubſtained *read* ſuſtained.

ſtudents have been already warned, that they muſt be jealous of thoſe who pretend to give them plates; "that ſome are capable of making plates for them, and ſome are not; that thoſe who are beſt able to give them plates, either will not undertake the labour, or cannot find time." And ſo, the half only of this delicate argument was left unpronounced, which was already but too plain. Now, although ſome unfortunate publiſher of Anatomical Drawings was thus left impaled upon the horn of this broken dilemma, any implied reproach could not be aimed at me particularly, ſince my book was not publiſhed; it was only advertiſed. This is perhaps a ſort of caution, which it might in certain circumſtances be very right, or very dutiful, or very convenient, perhaps, to give; as young men, no doubt, need ſome careful perſon to inſtruct and help their judgements, eſpecially in ſuch tender points as this is. But ſhould it ever happen, that a man of high rank and character ſhould be found, ſtriving to hurt any poor endeavours of mine, I might feel that riſing within me, which it were almoſt a meanneſs to ſuppreſs *; and reply to him in the words of Lord Shaftſbury: "You, Sir, have a character, which ſets you above us far, and releaſes you from thoſe decorums, and conſtraining meaſures of behaviour

* Ille ſapit, qui te ſic utitur, omnia ferre
Si potes ac debes. JUVENAL.

" viour, to which we of an inferior ſort are bound; you may
" liberally deal out your compliments and ſalutations in what lan-
" guage you think fit; for I ſhall but ſtrive with myſelf to ſup-
" preſs whatever vanity might naturally ariſe in me for ſuch a fa-
" vour beſtowed; for, whatever may in the bottom be intended by
" ſuch treatment, it is impoſſible for me to term it other than a fa-
" vour, ſince there are certain enmities which it will ever be eſteem-
" ed an honour to have deſerved *."

The author ſurely will not be accuſed of ſuch want of taſte, and reliſh for elegant drawing or engraving, as to hold theſe plates out as excelling in what is beautiful; yet, may he not hope, that they are not wanting in what is uſeful? They want that ſize which gives ſplendor to a grander work, and of courſe that proportion, which gives the full idea of the human body; they want that elegant drawing, and careful engraving, which ſhould do any idea juſtice, which is ſo neceſſary in delivering the minuter parts with character and truth; all is wanting that belongs to the idea of a grander work; an idea, which the author could not but feel, yet durſt not indulge. But ſtill he hopes they may be found ſimple, intelligible,

* Perhaps it was ſome ſuch critic as this that contrived that great anatomical drawing, which either I ſhould not have mentioned at all, or ſhould have given ſome ſhort account of.—Indeed it is not eaſy to deliver a fair hiſtory of even the moſt trivial improvement, and very ſeldom are we able to diſcover by what happy chance an idea firſt ſprang up in the mind of its

telligible, and plain; having whatever belongs to a little ſyſtem of plates, intended merely to accompany a book of anatomy, and chiefly deſigned for thoſe who are entering on their ſtudies, and but little advanced; and he truſts that he will be indulged, in trying fairly, whether by attending to the correſpondence of ideas and repreſentations, whether by ordering his drawings ſo as to ſuit his book, whether by a careful combination of deſcriptions, drawings, and plans, he ſhall not be able to deliver a ſyſtem of anatomy, intelligible, or perhaps eaſy for his pupils; enabling them to enter the diſſecting room with confidence, and to leave it, not without inſtruction; and qualifying them alſo for underſtanding thoſe illuſtrations, which he ſhall continue to give, or the corrections and remarks of other teachers:—for that ſtudent has but a mean idea of the value of his profeſſion, who does not ſeek all means of inſtruction; and the teacher muſt have a poor conceit of his preſent knowledge, who does not hope, by his own diligence, to correct himſelf; or to receive leſſons from others, ſometimes friendly, too often, in this world tinctured with its enmities and paſſions; ſuch as are not pleaſant in receiving, which ſtill it is a duty to receive.

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its author; but perhaps the hiſtory of this grand figure might go in the following terms. The ingenious Mr Cruikſhanks, with the deſign of explaining all that he or Dr Hunter had injected, of the lymphatic ſyſtem, in one conſiſtent view, took a delicate and elegant drawing of the human body, and laid his lymphatics upon it, explaining at the ſame time his intention, and making his apologies for this little plan; but he could not forſee that the idea thus firſt ſuggeſ-

ted

WHILE I have ventured to ſpeak ſo fully concerning the general deſign of theſe plates, it is very natural for me to ſay alſo a few words concerning the mechanical labour.

I have drawn my plates with my own hand. I have engraved ſome of theſe plates, and etched almoſt the whole of them: Which I mention only to ſhow, that they have their chance of being correct in the anatomy, and that whatever, by my interference, they may have loſt in elegance, they have gained, I hope, in truth and accuracy.—And while I mention this, I muſt not be ungrateful to Mr Beugo, whoſe ſkill will, I hope, be ſhown on ſome higher occaſion, and whoſe character muſt not be hurt by any thing that may be ſeen here; for wherever in theſe plates all is fair and clean, it is owing to his care; and thoſe blots of execution which are not fairly covered, have not come through his correcting hand.—Whatever he has done alone has been hurried, allowing no time for artful or laborious engraving, though ſtill all that is here, I hope, is correct and true.

I

ted was to receive, in paſſing through a greater mind, a grander form.—The expedient was tried again, and the ſecond anatomiſt reſolving to outdo at one ſtroke all his rivals, and knowing of no ſurer way than this, had an engraving made of a moſt gigantic ſize! An Aſkapart! A figure of full ſix feet in height; which (bating the clumſineſs of conception) has turned out to be a drawing of ſuch ſingular beauty, that it will not be rivalled; and as there can be no repreſentation of the human body of more than 6 feet high, it poſitively cannot be excelled.—All thoſe who underſtand the intention and effect of engraving, or who have any idea of the bold and free manner which claſs drawings require, muſt wonder even at the report of ſuch a thing; but not as our poet Young wonders, "for wonder is involuntary praiſe;" if the emotion be involuntary, it will moſt likely be of another kind.

I have endeavoured, alſo, to keep the explanation of theſe plates to the moſt ſimple and natural form; knowing, by long experience, that anatomical deſcriptions are, even to the moſt earneſt and diligent ſtudent, very tedious and hard to be underſtood. The loading of ſuch a ſtudy as Anatomy with peculiar or affected language, and with needleſs terms of art, where too many are really needful, has a tawdry and vulgar appearance, of which we have much reaſon to be aſhamed; it is a barbarous jargon, to which our ear is ſubdued only by long and inveterate cuſtom: and our continual uſe of this traſhy language in ſchool books, preſents to the ſtudent the difficult and harraſſing taſk of learning at once a new ſcience and a ſtrange language.

SWIFT, who commends ſimplicity of language, and enforces his leſſon by the moſt beautiful examples, ſays, "When the water is clear you will "eaſily ſee to the bottom;" but anatomiſts have ſtirred up their technical terms ſo thick, that the ſtudent has but a poor chance of ſeeing to the bottom, unleſs we ſhall agree in letting this ſediment quietly ſubſide again.

The medical ſtudent is, indeed, ſo accuſtomed to hard words, that he can ſcarcely think any book accurate or complete that is without them; and however well he may underſtand its deſcriptions, cannot believe them true. He is not only accuſtomed to know the moſt difficult parts by the hardeſt names, but to have the detail given to him in ſuch expletives, as the Poſterior, Anterior, Superior, Inferior *; and often after all, this Superior Anterior portion

* Our ſcience in this country has got this vile farrago, of Anterior, Superior, &c. through bad tranſlations of Latin and French, where ſuch words as *Superieure* or *Superior* are in their place.

tion is but one extremity forſooth, or one portion of a part, which having other poſterior extremities, or anterior portions, has to paſs ſtill through a long declenſion of theſe curious terms, which have not, like the terms in any other ſcience, the property of conveying more regular and clear ideas, nor of ſaving ſuperfluous words. They ſtand in place of the ſimple expreſſion of upper or lower ends.—Now this clutter of hard names confounds the ear, as well as puzzles the judgement of the ſtudent, and is truely a diſgrace to the ſcience ;—it looks as if we believed Anatomy to conſiſt in ſtrange terms, and that we could not write in true character of Anatomiſts, but by departing as widely as poſſible from the language of gentlemen. I have ventured, inſtead of "ſetting up this rank and file of tall opaque words "betwixt the reader's imagination, and my own conceptions," to make every deſcription as ſimple as may be,—uſing no hard words, but the pure names ; chooſing rather that my book ſhould be plainly underſtood, than admired as a piece of unintelligible profound anatomy.

THE

FIRST BOOK

OF THE

BONES.

TO

Dr. DANIEL RUTHERFORD,

PROFESSOR OF MEDICINE AND BOTANY,

AND

PHYSICIAN TO THE ROYAL INFIRMARY,

EDINBURGH.

SIR,

In presenting this Book of Plates to one who is so well able as you are to judge of their defects, I ought to add some value to the offering, by declaring the motives of it.—It is a mark of gratitude for the friendly care with which, in company with my worthy Master, you watched over me during a long and dangerous illness. Perhaps there can be no higher compliment betwixt medical men, than this confidence in time of sickness; and surely, if I may judge from my own feelings, nothing can be more grateful than the remembrance of kindnesses bestowed at such a time.——May your skill be long useful to your fellow-citizens; and may it be always valued as I value it.

I am,

SIR,

With respect,

Your Friend, and Humble Servant,

JOHN BELL.

PREFACE.

WHEN a young man, who had been blind from his childish years, had his ſight reſtored to him by our celebrated ſurgeon CHESSELDEN, all his thoughts, and feelings, and pleaſures, and pains, were very intereſting to his friends; for that moſt delightful of all our ſenſes was to him as a dream of fairy viſions, confuſed, yet delightful, beyond all that the fancy can conceive. "He was like one newly born into the world, needing to learn "anew all the objects around him, knowing nothing by the eye, "but all by the touch. It was long before he found out that pic-"tures repreſented ſolid bodies, and then he was much ſurpriſed "that thoſe things, which to the eye ſeemed prominent and round, "were to the touch quite even and flat; he aſked his friends which "was indeed the lying ſenſe, feeling or ſeeing."

"Being ſhown his father's picture in a locket, at his mother's
" watch, and told what it was, he acknowledged a likeneſs, but
" was vaſtly ſurpriſed; aſking, how it could be that a large face
" could be expreſſed in ſo little room; ſaying, it ſhould have ſeemed
" as impoſſible to him, as to have put a buſhel of any thing into a
" pint."

Now there are many, who having enjoyed and uſed this precious ſenſe during all their lives, have never come to know, like this young man, that, even within the narroweſt circle, the repreſentation is as perfect and true, as in the full ſize of the human body; fooliſhly imagining that nothing can be drawn but of its natural ſize. If a man were to take this fancy, that nothing of anatomy could be drawn but of the full ſize of life, with what high contempt muſt he look down upon theſe little plates; where I have endeavoured to repreſent, in this miniature form, what it muſt be confeſſed, might be more fully repreſented on a larger ſcale: and yet I am ſenſible, that thoſe, who cannot underſtand theſe plates, will hardly profit even by that ſtately anatomical figure of full ſix feet high, which, being cut in copper, with googes, and chiſſels, and mallets, and all kinds of inſtruments, muſt eſtabliſh a reputation for its author; which, if not high, will not fail to be at leaſt of a laſting kind; neither apt to be forgotten, nor liable, like other diſcoveries, to go aſtray.

2 As

"As I proceeded in writing a book of anatomy, I felt more "and more, at every ſtep, the neceſſity of giving plates to it;" for a book of anatomy without theſe ſeemed to me no better than a book of geography without its maps; it was, in my mind, like teaching mathematics without diagrams, or ſolving Euclid's problems without the help of figures or lines, by the mere force of imagination alone. Indeed any one, who, ſtudying without ſome help of plates, tries to underſtand and to remember an anatomical deſcription with no other repreſentation than words merely, will feel, that he is like one attempting to work a rule of arithmetic without the uſe of cyphers, trying to remember the value and denomination of each part throughout the whole train of numbers; he is ingenious in difficulties, making an abſtract ſubject of one belonging to the ſenſes chiefly, and attempting to obtain by words, thoſe ideas which muſt come to him only through the eye.

It was while I was writing anatomical deſcriptions that I firſt thought of drawings, and of placing my ſubjects in thoſe very ſhapes and poſtures in which they were explained:—and I conceived, that the deſcriptions and the drawings might thus be wrought into one perfect whole; being as two parts of one idea, or as one idea preſented in a double form, once to the eye, and once again to the ear. If, in any material points, my drawings and deſcriptions ſhall thus agree, then muſt the ideas be made out to my reader clear and fair; and ſhould inſinuate themſelves into his mind without labour or

 thought

thought on his part; while he is not toiling from defcriptions to drawings; not harraffed with continual interruptions, incongruous ideas, parts defcribed but not reprefented, or reprefented and not defcribed; not travelling far and wide from the ideas of one author, to the reprefentation of another; never trying to affociate ideas which have no affinity, nor ftriving to bring drawings and defcriptions together which are as far, as may be, from being parts of the fame idea, or from being capable of that clofe comparifon which the ftudent feeks, and miffes with a difappointment which is continually renewed. Such muft be the ftudent's labour, (a labour which might well opprefs the moft active mind,) if the teacher be not careful to preferve for him this correfpondence of ideas; whether he be employed in comparing his lecture with the fubject lying before him, or his drawings with his book.

From the firft dawnings of anatomical knowledge, or at leaft from the very earlieft invention of anatomical plates, this vitious practice has prevailed, that each author, carelefs of this correfpondence of ideas; never thinking of the harmony that ought ftill to fubfift between thofe notions which are to be conveyed by words, and thofe which fpeak to the eye, in the truer language of this fubject; intending merely to write a book, and rather with the hopes of procuring himfelf a name, than with the prouder expectation of multiplying and varying the fources of inftruction, writes his

book

book after his own way; and takes his plates, perhaps, where he is directed by his bookſeller, or where he may moſt ſafely ſteal; and often chuſing them of a faſhion fifty years older than that book, into the gaps and interſtices of which, they are to be nitched and ſtuck up, wherever they will make the handſomeſt figure, not where they will be of the moſt uſe.

This ironical praiſe may be very ſafely given to the older anatomiſts for their love of original drawings, that having once ſet their taſte to one certain ſyſtem of plates, they have been very conſtant and true to their firſt choice. It is thus that the plates of Veſalius, Fallopius, or Euſtachius, have deſcended, with ſome diſtortions and abridgements indeed, but ſtill unpolluted with any ſtain of originality, nor vitiated by any one improvement of repreſentation or of thought, through the books of Vidus Vidius, Pareus, Stephanus, Blanchardus, Veſlingius, Riolanus, Verhein, Palfin, Dionis, and a thouſand others. Thus have the once beautiful plates of Veſalius, (mangled and deformed, cut down to ſuit books of all ſizes, twiſted and accommodated to all ſubjects and all forms of explanation,) deſcended to us in ſuch diſtorted ſhapes, that while we are looking over their books to fix upon them this indictment of plagiariſm, we can hardly recogniſe the original drawings ſo fairly as to prove the deed.

Even

Even in the firſt invention of our beſt anatomical figures, we ſee a continual ſtruggle between the anatomiſt and the painter; one ſtriving for elegance of form, the other inſiſting upon accuracy of repreſentation. It was thus that the celebrated Titian conſented to draw for Veſalius: Though it is but too plain that there can be no truth in drawings, thus monſtrouſly compounded betwixt the imagination of the painter, and the ſober remonſtrances of the anatomiſt, ſtriving for accurate anatomy, where the thing cannot be; for thoſe figures, which are ſuppoſed to be drawn truly from the anatomical table, are formed from the imagination of the painter merely; ſturdy and active figures, with a ludicrous contraſt of furious countenances, and active limbs, combined with ragged muſcles, and naked bones, and diſſected bowels, which they are buſily employed in ſupporting, forſooth, or even demonſtrating with their hands. This vitious practice of drawing from imagination merely is well examplified in this, that anatomiſts have, with one conſent, agreed to borrow the celebrated Torſo for putting their bowels into, to explain them there; a practice which has deſcended from the time of Veſalius down to Cheſſelden, and from him to the ſyſtems of the preſent day.

No painter in natural hiſtory, in botany, in mechanics, nor in any thing that relates to ſcience, would dare to draw without his

his ſubject immediately before him: but anatomiſts, who moſt of all need this clearneſs and truth, have been moſt of all arbitrary and looſe in their methods; not repreſenting what they ſaw, but what they themſelves imagined, or what others choſe to report to them:—hence the careleſs copying from book to book, the interpolations of anatomiſts, the interference of painters in a ſubject degrading to their higher art, the errors and miſtakes of engravers, and the ſubjection of true anatomical drawing to the capricious interference of the artiſt, whoſe rule it has too often been to make all beautiful and ſmooth, leaving no harſhneſs nor apparent blurr in all his work. Even the celebrated book of Albinus has been thus abuſed; and though he is ſparing of cellular ſubſtance, and glands, and fat, and veſſels; of all that gives a drawing its likeneſs to the human body; even the little that he had given, is now rounded down into the ſmoothneſs of ivory, as if a model had been made and drawn from. Albinus, (naturally ſparing of ornament, and wanting in the natural character of parts) lived to ſee his drawings thus robbed of the little that they poſſeſſed of grace or nature; and then produced, as if in mere wantonneſs and ſport, under the high title of ANATOMY of PAINTING; but by one, who ſeems too grave to have intended any ſtroke of irony, ſo refined as this.

A higher taſte prevails in the preſent age; and the ſplendid and noble works of Morgagni, Haller, Bidloo, and Albinus, and

of

of Cheſſelden, Hunter and Cowper, are drawn truly, and from nature, and cannot be forgotten, while anatomy, and the arts depending on it, continue to be eſteemed. Yet even, among thoſe great men, we have ſeen an idea gradually improving, till at laſt it was brought by Haller to the true point. For Albinus's drawings are merely plans: Bidloo's tables are beautiful and maſterly; but being wanting in regularity and order, they want altogether the clearneſs of a plan; Haller's drawings are as fair as Bidloo's, as regular as thoſe of Albinus; and combine in one the truth and ſometimes the elegance of drawing, with the plainneſs and accuracy of a mere plan.

If an anatomiſt ſhall ſet up a ſkeleton, and draw it in poſtures reſembling thoſe of life; if he ſhall diſſect the human body, ſtudying and drawing it in parts; if he ſhall continue drawing muſcle after muſcle, and one part after another, till he have gone through the whole; if he ſhall proceed then to take theſe drawings and notes of individual parts, and lay them over his firſt drawings of the bones; if he ſhall try to match the parts belonging to fifty individual bodies of different ſizes, of various forms, dying, ſome ſuddenly, and others ſlowly, ſome full and muſcular, others emaciated and poor; what will the reſult of all this be, but a mere plan? It is a plan merely, through all the proceſs, and in all its parts; it cannot be other than a plan when the whole work is

accompliſhed

accompliſhed and ſet up. It was an unlucky theory of this kind that carried the great ALBINUS, for fifteen years, through a courſe of laborious diſſections, painful and uſeleſs to himſelf; but uſeful to all thoſe who have to follow him: Still each drawing of his is but a mere plan, reſembling no individual body, reſembling in nothing the general drawing of the body; it is ſuch a view as never is to be ſeen in a diſſection. It is not, like our COUPER's nor like BIDLOO's, a true drawing of muſcles daſhed with touches of glands, and fat, and cellular ſubſtance, which are the natural diſtinctions of parts; nor mixed with the branchings of arteries or nerves, the chief objects for which we ſtudy the muſcles; but it is like a ſtatue anatomiſed, where all the irregularities of ſubſtance, all the gradations of bones, ligaments, tendons, and fleſh, are rounded down with a ſtudied ſmoothneſs; it is a figure which the ſtudent can never compare with the body as it lies before him for diſſection; it is a figure ſuiting more the eye of the painter than the eye of the anatomiſt; nor even pleaſant to his eye, ſince it ſtands in attitudes, which no ſwelling of particular muſcles ſeems to ſupport.

In the other extreme is BIDLOO; for, in his plates, the maſter-hand of the painter prevails almoſt alone; while whole ſheets of infinite labour ſerve only to explain the joinings of the clavicles, or perhaps the form of one trifling muſcle or gland. The formal fi-

gures of ALBINUS are more desireable than these. But, in either book, we regret either extreme; in ALBINUS we think that we understand every muscle of the human body! but our knowledge hardly bears the test of dissection; the drawings and the subject never can be directly compared:—In BIDLOO, we have the very subject before us! the tables, the knives, the apparatus, down even to the flies that haunt the places of dissection, all are presented with the main object of the plate; and thus we have perfect confidence in the drawing; in which also the parts are laid out in a bold and masterly stile, so that the dead subject and the engraving can well bear to be compared. But in BIDLOO there is often no classification nor arrangement, no breadth of parts, by which we can understand a whole limb; a thigh is presented with no one marked point; neither the haunch nor the knee are seen: His plates are all elegance in respect of drawing; in respect of anatomy, they are all disorder and confusion; and one must be both anatomist and painter to guess what is meant, how the limb is laid, and what parts are seen.

It is to HALLER that we must give the palm; who having to do with parts chiefly, and not with a whole, has seldom offended by drawing a dissected body, after a living form; nor by planning and dividing a living form into the parts of a dissected body; but has given his drawings truly from the anatomical table; and with the truest drawing, has given, very often, all the distinctness of a plan.

Now

Now we ſhould always remember that anatomy is to be learnt only by diſſection*; diſſection is the firſt and laſt buſineſs of the ſtudent; and when drawings are made for his uſe, the body ſhould be laid out, as he is to order it in diſſection; the belly ſhould be diſplayed, as he can diſplay it in his ſubject; an arm ſhould be ſo drawn, that, when he diſſects the arm of the ſubject, it may fall naturally upon the table, exactly as he finds it in his book; and ſtill the poſture of arms, and legs, and heads, ſhould be preſerved diſtinct and clear: enough of the general figure ſhould be kept to explain the poſture of parts; there ſhould be kept up a natural correſpondence among the ſeveral drawings; and while the true anatomical drawing is delivered upon one plate, a plan, if it be required, ſhould be added upon the next.

* If anatomy is to be acquired in this way only, then muſt we underſtand by a ſchool of anatomy a ſchool of diſſection: Yet thoſe who have had the happineſs of proſecuting their ſtudies in foreign univerſities, or in the London ſchools, will hardly believe it, that there is at leaſt one place of education much celebrated, and worthy to be ſo, where the ſtudy of anatomy is denied or proſcribed.—Where not only it is not praiſeworthy, but even dangerous to propoſe diſſections; where the man who may be ſo bold as to do his duty in that moſt important ſtudy, ſhall be traduced in filthy pamphlets, thruſt officiouſly, and with intentions not of the pureſt kind, into the hands of every young man who comes to ſchool. If I have felt this, it has been ſtill in ſilence; till I now ſpeak of it, not formally, but by chance; not with the mean thought of preſenting myſelf as a perſecuted man, nor of indulging a reſentment which were loſt upon ſuch people, or upon ſuch an occaſion; but to make my acknowlegements to one, whoſe generous conduct is not unknown; who is truly intereſted in the honour and reputation of that univerſity to which he belongs; who is at once an honour and defence to it; and whoſe ſingle praiſe, (may I be allowed to ſay what touches myſelf ſo nearly,) "ſhall outweigh a whole theatre of "others."

I know but too well that few will ſubmit to learn anatomy, as they ſhould do, by the dry reading of anatomical deſcriptions, and the tedious comparing of theſe with the ſubject, or with their plates; and there are very few, who have learned this uſeful truth, that they are to become acquainted with parts only by being maſters of the whole. One propoſes to himſelf to learn the bones only; another deſigns to attend chiefly to the joints; a third will ſtudy the arteries only, "for the arteries are of chief uſe to the ſurgeon;" another delights in ſtudying the viſcera, and is ſorely diſappointed if he fail to underſtand the brain; while anatomy abſolutely is not to be ſtudied in parts, but is one fair and continued circle, where ſuch is the correſpondence, and mutual connection of all the parts, that he who would know the muſcles, muſt firſt ſtudy the bones; and he who would learn the blood veſſels, and nerves, (which are indeed the moſt important to the ſurgeon,) muſt know the muſcles thoroughly. It is according to the muſcles, that all the other parts are to be deſcribed; for when we trace the courſe of a blood veſſel, it is by purſuing its intricate wanderings among the muſcles: it gives its firſt branch to one muſcle, its ſecond branch to another; it forks into two, under the belly of a third; it goes through the ſubſtance of a fourth muſcle, or accompanies its tendon, or runs along the edge of its fleſhy belly: So that in deſcribing a great veſſel, we mark its exit from the trunk of the body, its entrance into the arm-pit or groin, its courſe down the arm or thigh; the dangers, the wounds, the operations of each great artery or nerve, are recorded according to the parts which

their

their ſeveral branches ſupply. And beſides theſe conſiderations, which cannot but have their weight, we muſt not forget, that the wounds of the muſcles, the ſprains of tendons, the rupture of ligaments, the collections under the general faſciæ or broad tendons of the limbs, are of themſelves ſufficient and direct motives; the only ones, indeed, that need be aſſigned for teaching the anatomy of the muſcles with particular care.

Yet, labour it as we will, how poorly ought we to think of our own diligence, when we find Statuaries or Painters ſtudying the anatomy of the human body, with a perſeverance and ſucceſs which may well put us to ſhame! Painters merely, who having no object ſo important, nor ſo intereſting, as the injuries and accidents of the body, deſire nothing more than to underſtand its external beauty and its form.

The Greeks lived in the moſt delightful countries of the world; the moſt beautiful people; ſometimes happy, and always free. Among them the arts grew and flouriſhed, and were to all ranks the chief buſineſs and pleaſure of life:—for moderation and ſimplicity was in their dwellings, while all their riches were reſerved for ſhows and feſtivals, for adorning their native city, for the public uſe. Their temples, and ſtreets, and halls were filled with repreſentations of a beauty, which never exiſted but among that happy people, or lives now only in their works, the admiration and reproach of our laggard times.—They ſaw, in their public games, the lovely forms of their

their youth moving in dignity and grace: For there were ſeen in mixed aſſembly;—in their women, the pureſt models of female beauty;—in their young men, the grandeſt diſplays of the manly form; moving and in action; inſpired by every noble emulation, exulting in their ſtrength; or advancing into the public view, only to ſhow the beauties of their form.——Their artiſts needed no helps of anatomy; but in thoſe delightful ſpectacles collected all the modes and forms of beauty, to combine them into one high ideal form. *

The moderns have come poorly after, in this great career; copying coldly thoſe half-animated forms, which are ſeen in our ſchools of the arts fixed in laborious poſtures, "ſelling their igno-" ble beauty for a price." Senſible of this great defect, our artiſts have taken the help of anatomy to correct this tame unmeaning form; ſtudying with a noble perſeverance, (but as their own critics acknowledge to us,) with but poor ſucceſs. They ſtudy each muſcle; they note down its direction and uſe; they gueſs at its office, and power in certain poſtures of the body; and try to mark it in its juſt place. The modern ſtatuary, is like one wandering among the ruins of ſome noble city, who finding the remains of a temple, traces its lines among the ruins, and, upon this ſlender knowledge, tries to imagine and coldly repreſent to us its loſt form and antient grandeur.

It

* "We are taught by philoſophy, the natural pre-eminence and high rank of ſpecific ideas "above individual forms."——Harris.

It was thus that Michael Angelo ſtudied our profeſſion: and ſtudied it ſo, that the leſſons of that great maſter are a reproach to thoſe who profeſs anatomical knowledge. His knowledge of anatomy gave to all his works a caſt "approaching more nearly to "the Etruſcan ſtyle, than to the purer taſte of the Greeks;" marking them too harſhly with traits of learning. His violent diſtortions and ſudden ſhortenings of the limbs are leſs pleaſing to thoſe who delight in the delicate and higher beauty; fitting him leſs for repreſenting the female form, than for giving bold and terrible pictures of action and ſtrength. But ſtill he is correct and true in all that belongs to the anatomy of the human body; and his ſtudies are a trial of the anatomiſt's ſkill;—for in looking upon one of theſe, we find that the knee, the ancle, the neck, the wriſt, each head and projecting point of bone, is truly marked; while the diſtortion of the figure, the violent action of the limbs, the ſhortenings and bending of the joints, and the intricacy of the whole poſture are difficult in the extreme; but ſtill each limb is true, and every individual muſcle ſwelling in its juſt degree, ſo as to preſerve correctly the proportions and balance of the whole. Should not we be aſhamed to compare our languid endeavours with the perfect knowledge of this great painter, the very notes of whoſe deeper ſtudies in anatomy we are unable to read?

But in our profeſſion, though the very ſcience might almoſt be defined a knowledge of parts, induſtry and knowledge are but of low

 repute,

repute, and the very name of diligence and mere labour, a term of reproach; while genius is in truth nothing but a ſtrong deſire of knowledge, and the ſpirit of induſtry its trueſt mark. Let not the ſtudent of anatomy deſpiſe labour, nor hope to acquire his knowledge by other means. In juſtice to his own genius, he muſt take all advantage of deſcriptions, and drawings, and diſſections, and plans; feeling, no doubt, in his firſt difficulties the need of every help, but ſtriving to mount, by ſlow degrees, from ſuch elementary books, as that which I now preſent him with, to thoſe noble and ſplendid works, which were the beginning of correct anatomy, and will not be forgotten, while that branch of knowledge is reſpected or known. And here may I not complain, that, in ſcheming theſe plates, I am curbed and bound in by the oeconomy of my plan? If, indeed, by wiſhing merely, the thing could be accompliſhed, this word oeconomy ſhould never more be heard of in all that relates to ſcience; but many are to ſtudy our profeſſion who cannot command thoſe noble works; and every young man who is to ſtudy an art in which the intereſts of ſociety are ſo immediate and ſo ſtrong, ſhould have the means of inſtruction put within his reach. If there be any teacher, then, who being circumſcribed in point of time, would conſent to offer his help and inſtructions in that form in which he could give them, regarding more his duty than his good name, to him this motive ſhall be my apology; it ſhall be my apology to all thoſe who can feel with me a ſincere deſire to do good and to be uſeful;—but not to all!—for

ſtudents

BOOK FIRST.

OF THE

BONES.

PLATE I.

This Plate explains the Text Book, from Page 35, to Page 52.

IN this Plate are repreſented the Adult and Fœtal Sculls, that they may be fairly compared with each other;——and there is explained here, not the minute anatomy of the individual parts, but the general view only, viz. the Bones of which the Cranium is compoſed; ——the Sutures by which the ſeveral bones are joined. And, in the Fœtal Scull, the form and proceſs of Oſſification; and the interſtices called Fontanelles, which are always left membraneous, during the ſlow oſſification of the child's head.

 FIGURE I.

FIGURE I.

THE ADULT SCULL.

A The Frontal Bone, where (*a*) ſhows the ſerrated edge which forms the Coronal Suture; —— (*b*) the flatter part behind the Eye, which is plain and hollow for lodging the Temporal Muſcle; —— (*c*) is the acute angle of the bone, which is called the External Angular Proceſs, from its forming the outer angle or corner of the eye; —— and (*d*) is that prominence over the noſe, under which there is a ſmall cavity within the bone, called the Frontal Sinus, which the ſurgeon avoids in performing the operation of trepan; though it is rather from the difficulty of perforating this part that he ſhuns it, than from any danger in the perforation.

B The Parietal Bone. The letter B points to that great line, which running according to the length of the bone, with a rainbow-like arch, divides the ſurface into two equal parts, of which the upper and ſmooth-part (*e*) is covered with the thin expanded tendon of the Occipito-Frontalis Muscle, while the lower part (*f*) has its ſurface radiated; and theſe radii are the impreſſions of the particular bundles of which the Temporal Muſcle conſiſts; ſo that "the white "ſemicircular line (B) repreſents the origin of the temporal muſcle; and the con- "verging lines on the ſurface (*f*) expreſs the manner, in which the fibres of "the muſcle are gathered into a ſmaller compaſs to paſs under the jugum." *Vid. P.* 61.—(*g*) points to a ſmall hole in the back part of this bone, which is ſometimes large, ſometimes wanting; and which gives paſſage to a ſmall vein of the integuments, (going inwards to the longitudinal ſinus or great vein of the head) and alſo to a ſmall artery, which accompanies the vein: (*h*) marks that corner which, running down ſharper and longer into the temple, is often called

called the Spinous Procefs of the Parietal Bone; and this corner is the more to be obferved, that it is under it that the great artery of the Dura Mater runs.

C The OCCIPITAL BONE, of which but a very fmall part is feen in this direction.

D Is the TEMPORAL BONE, feen full and direct from one fide; where (*i*) marks that thin upper edge, which forms the fquamous future; (*k*) the deep and flat part of the bone, on which the temporal mufcle lies; (*l*) the Maftoid or Mamillary Procefs, named from its refemblance to a nipple; (*m*) the Styloid Procefs, which ftands out over the back part of the throat to give origin to feveral mufcles of the throat and tongue; (*n*) is the Zygomatic Procefs, which, joining with a fimilar procefs of the cheek bone, forms the zygoma or arch; (*o*) marks the Ring of the Meatus Auditorius Externus, or outward ring of the ear; and (*p*) fhows a fmall hole, which, like that of the parietal bone, tranfmits a vein paffing from without into the great finus or vein within the fcull, and which belongs fometimes to the temporal, fometimes to the occipital bone, or fometimes is in the future betwixt them.

E The Os MALAE, or bone of the cheek, which forms the lower and fore part of the focket for the eye, and fupports the cheek; and by its prominence or flatnefs gives the form of the face;—one procefs (*q*) is feen here going up to meet the angular procefs of the frontal bone, and fo is named the Angular Procefs of the Cheek Bone; while (*r*) another procefs, called the Zygomatic Procefs of the Cheek Bone, goes to meet the zygomatic procefs of the temporal bone, forming the complete jugum, or yoke, under which the temporal mufcle paffes; and from that prominent part of the cheek bone, which is marked (*s*), there go two remarkable mufcles, one the Maffeter or Grinding Mufcle, which paffes from

 this

this part of the cheek bone into the angle of the lower jaw to pull it upwards; while another, a very ſlender and delicate muſcle, goes from the ſame point inwards towards the angle of the mouth, and is called Zygomaticus, or Diſtortor Oris.

F Points to the ſmall bones of the Noſe, named Nasal Bones; for there are two of them forming the root of the noſe, and the left one is ſeen here; the ſmall letter (*t*) points to what is called the Lateral Naſal Suture, which ſtretches to the upright proceſs of the upper jaw bone.

G Points to the Upper Jaw Bone, of which ſcarcely any thing is ſeen in this view, except the circle called the Alveolar or Socket Proceſs, in which the teeth are ſet.

H Marks the Lower Jaw Bone; and the letter is placed upon that point of the Bone which is called the Angle, into which the Maſſeter Muſcle is fixed;—— (*u*) marks that proceſs of the jaw which is called Coronoid or Horn-like, which goes up under the Zygoma to receive the great temporal muſcle as it paſſes under the arch;—and (*v*) is the Condyloid Proceſs, or that branch of the lower jaw bone, which is crowned with the condyle or head, forming the joint or hinge upon which the jaw moves; which head of the jaw bone is felt by putting the finger before the flap of the ear.

The Sutures are,

1. The Coronal Suture, running acroſs the head, joining the frontal to the parietal bones, extending from ear to ear; and going down into the Temple, where it joins the Squamous Suture, and, like it, is ſcaled, (*i. e.*) wants the indentations of a regular ſuture.

2. The

2. The LAMBDOIDAL SUTURE, joining the occipital to the parietal bones; ſtriding over the occiput, reſembling the Greek letter Λ.—But the reſemblance is a little hurt by the accident of an Os Wormianum, or irregular bone, ſuch as is found more frequently in this ſuture than in any other; ſometimes ſingle, as in the ſcull from which this was drawn; but ſometimes in great numbers, and not unfrequently of the ſize of a crown piece; theſe Oſſa Wormiana may diſplace the Lambdoidal Suture ſo, that being out of the uſual direction, it may be miſtaken for a fracture.

3. The SAGITTAL SUTURE, joining the parietal bones to each other; extending from the Lambdoidal to the Coronal Suture, as an arrow lies betwixt the ſtring and the bow.

4. The TEMPORAL or SQUAMOUS SUTURE, belonging chiefly to the temporal bone; and called ſquamous or ſcaled, becauſe the edges of the temporal and parietal bones are there extremely thin, and are laid over each other like the ſcales of armour. One part marked (*w*) lying betwixt the occipital and parietal bones, is named the Additamentum Suturæ Squamoſæ, or ſupplement of the Squamous Suture.

5. Marks a part of the SPHÆNOIDAL SUTURE, joining the wing of the Sphænoid Bone, to the temporal, frontal, and parietal bones, for, in this hollow under the zygoma, all theſe bones meet by thin ſcaled edges, and lap over each other; ſo that all the ſutures in the Temple are ſquamous.

6. The TRANSVERSE SUTURE, is one which runs acroſs the face, through the middle of the orbits, and over the root of the noſe, and the end of it appears here, joining the angular proceſſes of the frontal bone, and of the cheek bone.

7. The ZYGOMATIC SUTURE.

FIGURE II.

FIGURE II.

THE FŒTAL SCULL.

EXPLAINS the FŒTAL SCULL;——where we find the holes, processes, and other marks, very imperfect: Of course a shorter and more simple explanation will serve.

A Is The FRONTAL BONE; and the letter is so placed, as to mark the central point, where the ossification begins; the ossification being more perfect at this point, and going in a radiated form towards all the edges of the bone, leaves the ossification very imperfect all round the edge of the bone; and at (*d*) there is a difference betwixt this and the Adult Scull, for here the cavity of the Frontal Sinus is not yet formed.

B The PARIETAL BONE; where also the letter marks the center of ossification; the radii are very plain; and the edges are seen imperfect and membraneous, leaving all the sutures imperfect. The ridge, which divides the bone, is not yet formed; for the Temporal Muscle has not yet begun to mark the bone.

C The OCCIPITAL BONE; where the letter again in this bone, points to an ossifying central point.

D The TEMPORAL BONE; where many parts, marked in the Adult Scull, as the Styloid and Mastoid processes,—the small hole,—and the marks of the Temporal Muscle, are all wanting. And the ring (*o*) of the Meatus Auditorius Externus,

is

is merely a ring; is fixed to the bone only, and not joined with it; and is here ſeen covered with the ſmooth Membrane of the Tympanum, or Drum of the Ear.

E The CHEEK BONE; which, like all the other bones, is very round, and its edges blunt and ill defined.

F The SMALL BONES of the Noſe.

G The UPPER JAW BONE; where, ſince the teeth are not yet come up, the Alveolar or Socket Proceſs is not formed, nor even marked.

H The LOWER JAW BONE; where alſo the Alveolar Proceſs is wanting, and where the branch of the jaw bone does not riſe from the baſis, or lower line, with a bold and acute angle, but goes obliquely off, more horizontal, and more in the ſame direction with the reſt of the bone.

And laſtly, the chief point to be obſerved, in the ſcull of a child, is the openings of the head; for the parietal bone is ſo incomplete round all its edges, that it leaves all the ſutures imperfect and membraneous, and leaves ſome openings particularly large. (*aaaa*) mark the four corners of the greater opening upon the top of the head; which, from the hypotheſis of its ſerving as a drain, is called the Fontanelle, or Fountain of Moiſture. It has four angles, is formed by four croſſing ſutures; the Sagittal Suture, deſcending quite to the noſe. The Fontanelle is covered only with a thin and delicate membrane; it is named the Greater Anterior, or True Fontanelle, the opening of the head.

(*b*) Marks

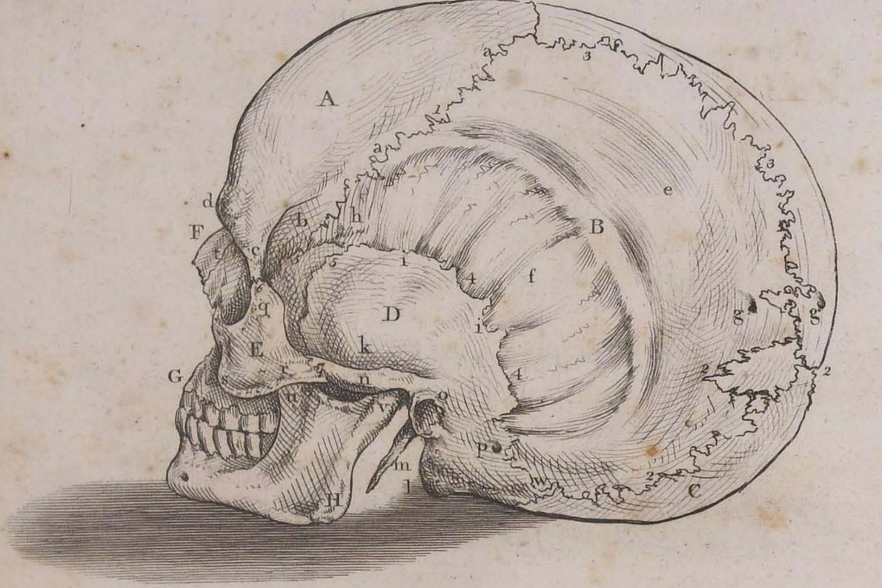
(*b*) Marks a leſs opening, which is formed by the meeting of the Lambdoidal and Sagittal Sutures; but, as they do not croſs, there are here but 3 converging lines; three angles or points of bone; no perceptible opening, but the bones rather lapping over each other. It is over this point that the hair turns in a ſort of vortex, if we may be allowed to explain it ſo; and though the greater Fontanelle was thought to preſent in labour, this back Fontanelle is the true preſenting point.

(*c*) Marks a ſmall Fontanelle, or membraneous interſtice before the ear; and

(*d*) Marks another ſmall Fontanelle behind the ear, in the place of the Additamentum Suturæ Squamoſæ; and it is the more to be remarked, as it is through this little Fontanelle, that the accoucheur opens the head in the rare coincidence of preternatural poſture of the child, and deformed Pelvis; where after delivering the body, it is impoſſible to get the head out: and he prefers this opening, and ſhuns the back Fontanelle, leſt, in piercing there, he ſhould cut the ligament of the neck, and ſo loſe his hold of the head.

PLATE II.

I

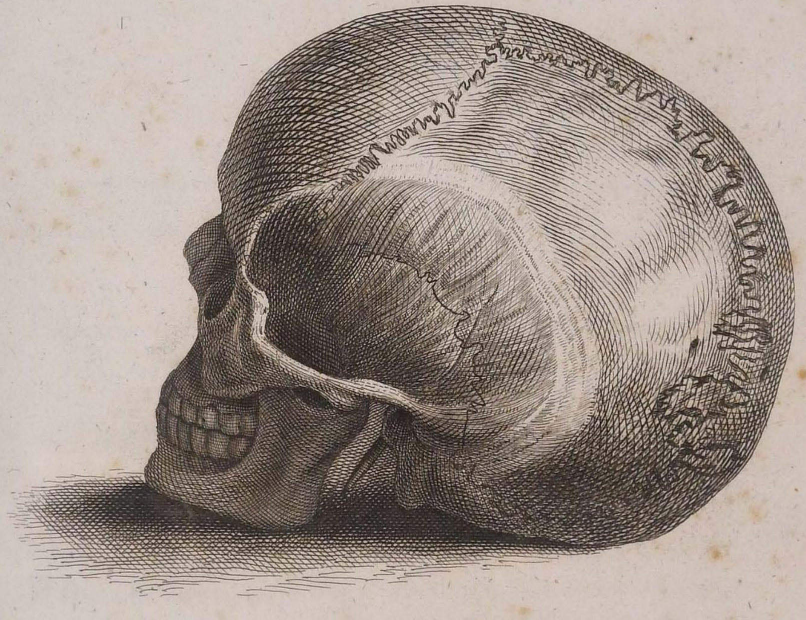


II

Engraved by J Bell

Published for the author J Bell october 1794

I



II

Published for the author J Bell october 1794

PLATE II.

This Plate explains the Text Book, from Page 52, to Page 65.

EXPLAINS the individual bones of the CRANIUM, the FRONTAL, PARIETAL, and OCCIPITAL BONES.

FIGURES I. AND II.

EXPLAIN the OS FRONTIS, or bone of the forehead. The numbers apply equally to either figure; and every number wanting in the firſt figure, muſt be ſought for in the ſecond.

1. The SUPERCILIARY RIDGES, on which the eye brows are placed, and which form the frontal ſinuſes. The ſkin is very firmly attached to the bone, all along this ridge; and the Frontal Muſcles ariſe here. The many ſmall dots, which are ſeen all along this ridge, are the marks of many little arteries, entering here to nouriſh the bone.

2. Points to that hole which is called the SUPERCILIARY HOLE, for it permits the ſmall Superciliary Artery and Nerve to come out from the ſocket of the eye to

turn upwards upon the forehead, where they take the names of Frontal Artery and Nerve. On the one ſide it is a fair round hole, on the other ſide it is a notch only.

3. The two INTERNAL ANGULAR PROCESSES.

4. The two EXTERNAL ANGULAR PROCESSES.

5. The Hollow behind the External Angular Proceſs, in which the Temporal Muſcle lies.

6. The NASAL PROCESS; ſtanding up ſharp and rough, betwixt the two internal angular proceſſes.

7. The BUMP, at the inner end of the Superciliary Ridge, marking the place of the Frontal Sinus, and indicating alſo the ſize of that cavity, by the degree of riſing.

8. The MOUTH of the FRONTAL SINUS; where it opens into the Noſe.

9. —is to be found on Figure II. only, and marks the SPINE, or Ridge to which the falx, or perpendicular partition of the Dura Mater is fixed; and (*a*) ſhows the groove, in which the ridge very generally terminates.

10. The two ORBITARY PLATES; which are thoſe two thin parts of the bone, which extend over the eye, ſo as to form the roof for the eye, and the floor for the fore lobes of the brain; and it is by the continual preſſure betwixt theſe two parts, that the Orbitary Proceſſes become ſo extremely thin, that they are quite tranſparent.

 (*b*) Marks

(*b*) Marks the ſpace or diſtance betwixt the two ORBITARY PROCESSES; which ſpace is occupied by the Œthmoid Bone, which thus lies over the root of the Noſe.

11. The mark of the Cartilaginous pully, through which the tendon of the Obliquus Oculi runs; and

12. Is the Superficial hollow for lodging the Lachrymal Gland in the upper part of the Orbit.

(*c*) Upon Figure II. ſhows the blind hole where the falx begins. This blind hole ſometimes belongs to the Frontal Bone, ſometimes to the Œthmoidal Bone, but lyes moſt commonly in the middle, betwixt the Œthmoid and Frontal Bones.

FIGURE III.

SHows the two OSSA PARIETALIA, or Parietal Bones, ſeparated from the other bones of the Cranium, and alſo parted a little from each other, ſo as to ſhow that ſerrated edge, which forms the Sagittal Sutures.

1. Shows the ſerrated edges, forming the SAGITTAL SUTURE.

2. The edge of both bones, which, in a ſemicircular form, produce by their union with the Frontal Bone, the CORONAL SUTURE.

3. The thin femicircular edges, to which the Temporal bones are joined, forming the Temporal or SQUAMOUS SUTURE.

4. The SPINOUS PROCESS; or largeft and moft pointed corner of the Parietal Bone.

5. The RADIATED SURFACE, upon which the great Temporal Mufcle lies; (*a*) marking that ridge of the bone, which divides it into two parts, and beyond which the origin of the Temporal Mufcle does not extend.

6. The place where the Artery of the Dura Mater firft makes its impreffion, *viz.* at that fharp corner of the bone, which fhoots down into the temple.

N. B. The only hole, which belongs to the Parietal Bone, cannot be feen in this view, but is to be found in the firft plate.

FIGURES IV. AND V.

EXPLAIN the OS OCCIPITIS. It is here fhown in two oppofite points of view, from within, and from without; the letters and figures apply to either figure; and the fourth figure naturally takes the lead, as the defcription of the Occipital Bone always begins with the external furface.

FIGURE IV. The outer furface.

1. The

1. The Upper Transverse Spine, formed for the implantation of the Trapezius and Complexus; or produced, according to ſome, by the action of theſe great muſcles.

2. The Smaller and Lower Spine, formed by the Recti Muſcles;—ſmall muſcles which come up from the firſt Vertebra to lay hold on the Occiput.

3. The Perpendicular Spine, which divides the muſcles of the oppoſite ſides from each other; and by this croſſing, theſe two ſpines are named, in general terms, the Crucial Spines.

4. The Great Tuberosity, ſometimes called the Spinous Proceſs of the Occipital Bone. (*a*) The Cuneiform Proceſs, which meets the Os Sphænoides. (*b*) The Condyle, or Joint Proceſs, on which the head moves, at leaſt in the nodding motion. (*c*) The Foramen Magnum, through which the ſpinal marrow paſſes out from the ſcull. (*d*) The Hole for the 9th, or Lingual, pair of Nerves. (*e*) The ſmaller Hole behind the Condyle, for the paſſage not of any nerve, but of a cervical vein going in towards the Great Lateral Sinus.

In Figure V. is explained the inner ſurface of the Occipital Bone; and the figures are continued, that the deſcription may go on ſtill in the ſame order.

5. Is the ridge to which the Tentorium, or membrane which ſupports the brain, and defends the Cerebellum, is fixed.

6. The two furrows, in which lie the Right and Left Lateral Sinuſes, making this broad groove.

7. The two hollows for lodging the backmoſt lobes of the brain, above the place of the Tentorium or ſupporting membrane.

 8. Two

8. Two fimilar hollows, for lodging the two lobes of the Cerebellum, below the place of the Tentorium or crofs membrane.

9. The mark of a fmall falx or procefs of the Dura Mater; which is like the great one, and like it contains a fmall finus or vein in it, the groove of which fmall finus is eafily feen here.

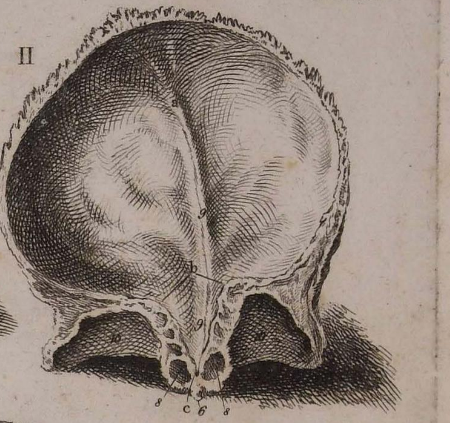
(a) The Cuneiform Procefs. (c) The Foramen Magnum. (d) The hole for the ninth pair of Nerves. (f) The hollow or thimble-like cavity, in which the end of the Lateral Sinus lies; for at this point the finus turns fuddenly round, efcapes from the fcull, and getting down into the neck, lofes the name of Sinus, and takes that of Internal Jugular Vein.

(g) There was left fticking to the end of this bone a fragment of the Sphœnoid bone, fo that at this point the Cuneiform proceffes of the Occipital and Sphœnoid bones are fo united, that to feparate them (in the adult at leaft), we muft break them; and in breaking thefe bones, the great cell of the Spœnoid bone, or part of it, ftuck to the Cuneiform procefs of the Occipital bone; and this cell is marked (g).

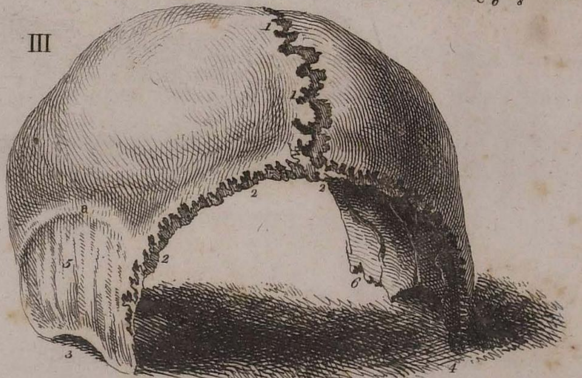
PLATE

I

II



III



IV

V

Published for the author J Bell october 1794

I. Beugo sculp.

PLATE III.

This Plate explains the Text Book, from Page 65, to Page 94.

EXPLAINS much of the difficult Anatomy of the Scull; for theſe bones, the TEMPORAL, ŒTHMOID, SPHOENOID, and UPPER JAW BONES, have many curious and intricate parts.

FIGURES I. AND II.

EXPLAIN the TEMPORAL BONE; and now again the letters and numbers belong in common to both figures; to Figure I. which explains all the parts that are upon the outſide of the Temporal Bone, and alſo to Figure II. which explains all that ſide of the Temporal Bone which is towards the brain.

The GREAT DIVISIONS of the Temporal Bone, are; (*a*) The ſquamous, or thinner part, forming the Squamous or Scaled Suture. (*b*) The Pars Petroſa, or Rock Part, which is, indeed, in the child, a diſtinct bone. (*c*) The Occipital Angle, or that corner of the bone, which is joined to the Os Occipitis, by the Additamentum Suturæ Squamoſæ.

The

THE PROCESSES OF THE TEMPORAL BONE ARE,

1. The ZYGOMATIC PROCESS, ſtretching forwards to meet that of the cheek bone.

2. The STYLOID PROCESS, ſtanding downwards over the throat, to give origin to many of the muſcles of the throat.

3. The VAGINAL PROCESS, which is a kind of rough riſing at the root of the Styloid Proceſs.

4. The MASTOID or MAMILLARY PROCESS, which is not formed in the child; which conſiſts of cells; it is felt immediately behind the ear, belongs to that organ, and is perforated (ſo it is propoſed at leaſt) in certain kinds of deafneſs.

5. The AUDITORY PROCESS, which is named a proceſs, becauſe it is in the child a diſtinct part, and ſtill is in the adult (as repreſented here) a prominent ring.

The HOLES of the TEMPORAL BONE relate chiefly to the EAR.

1. (*d*) Marks the MEATUS AUDITORIUS EXTERNUS, the outer Auditory hole, upon which the drum of the ear is braced down.

2. (*e*) The Internal Auditory Hole, or MEATUS AUDITORIUS INTERNUS, by which the Auditory Nerve has acceſs to the Ear.

3. (*f*) A ſmall hole for admitting a delicate thread-like nerve, which returns from without

without into the Cranium again, and joins the Portio Dura, or hard part of the Auditory Nerve while it is going along the paſſages within the Ear.

4. (*g*) The STYLO-MASTOID HOLE; which has its name, from its being at the root of the Styloid and Maſtoid proceſſes; it gives paſſage to the Portio Dura, or that ſmall hard Nerve, which accompanying the Auditory Nerve, goes along with it into the paſſage of the Ear; but, while the Portio Mollis, or proper Auditory Nerve remains within the Ear, this Portio Dura, a diſtinct Nerve, and deſtined for the face, comes out by the STYLO-MASTOID HOLE, under the ear, and ſpreads upon the cheek.

5. (*h*) Marks the ragged end of the Petrous Portion. The bony part of that canal, named the EUSTACHIAN TUBE ends here; but the Tube is chiefly Cartilaginous, and therefore in this the dried bone, its openings appear quite irregular and rough; and when the ſtudent looks for the Euſtachian Tube, he finds nothing but confuſed and ragged openings. The mouth of the Euſtachian Tube, as it appears when dried, is ſeen in its right place, *Vid. Pl.* VI.

6. (*i*) The hole for the CAROTID ARTERY is alſo to be looked for at this point, though it cannot be ſeen in this particular view, unleſs the end of the Petrous Portion were turned more directly towards the eye.

(*k*) Is the Great FURROW, which the Lateral Sinus, or great internal vein makes, forming a thimble-like cavity at (*l*), by the laſt ſudden turn which it makes before leaving the ſcull.

(*m*) Is a very ſmall FURROW, formed by a ſmall Sinus, or vein, which goes along the ridge of the Petrous Portion.

 7. (*n*) Is

7. (*n*) Is the laſt or 7th hole of the Temporal Bone. This is the ſmall hole, formerly mentioned for the paſſage of a trifling vein from without into the Lateral Sinus.

N. B. The joint or Condyle of the lower jaw is ſet in the hollow (*o*) juſt under the root of the Zygomatic Proceſs.

FIGURES III. AND IV.

EXPLAIN the ŒTHMOID BONE; FIGURE III. ſhowing chiefly the upper ſurface of the bone, which ſupports the fore part of the brain, and which is marked by the Criſta Galli (*b*); and FIGURE IV. ſhows that confuſed ſurface, which hangs over the root or upper part of the Noſe, and whoſe ſpongy bones, (*dd*) form a part of the Organ of Smell.

(*a*) The CRIBRIFORM PLATE is the center, as it were, of this bone, to which all the other parts are referred; this plate is perforated by the Olfactory Nerves, and it is from this horizontal and perforated plate, that the whole bone has its name.

The parts belonging to the Œthmoid Bone are,

1. (*b*) Is the Perpendicular Proceſs, which ſtands up from the Cribriform Plate, towards the brain; and is named CRISTA GALLI.

2. (*c*) Is the NASAL PLATE; which forms the Septum or partition of the Noſe, ſtanding perpendicularly downwards and forwards, as the Criſta Galli ſtands upwards: the Criſta Galli and the Naſal Plate, are exactly oppoſite to each other.

3. (*dd*) The

3. (*dd*) The two upper Spongy Bones; they are named ſpongy, from their conſtitution, for they conſiſt of cells; they are called Oſſa Spongioſa Superiora, to diſtinguiſh them from two ſimilar bones, which hang in the lower part of the Noſe. They are ſpoken of as diſtinct bones, while they are but parts of the Œthmoid Bone.

4. (*e*) The ORBITARY PLATE of the Œthmoid Bone; which, as it is incloſed among the other bones of the Orbit, ſeems to be a diſtinct bone ſurrounded by a peculiar ſuture, and ſo is named the Os Planum; though it is merely the flat ſide of the Œthmoid Bone.

5. (*f*) Marks the place where the Os UNGUIS ſhould be ſeen; but it is pulled away to ſhow the numerous cells of the Œthmoid Bone. Theſe cells are divided into two ſets, one ſet attached to the Orbitary Plate, or flat ſquare ſide of the Œthmoid Bone, the other ſet to the Spongy Bone.

6. (*g*) FIGURE IV. ſhows that ſet of the cells, which more particularly belongs to the Spongy Bone, and (*h*) FIGURE III. ſhows the cells opened from above, to give a view of thoſe, which more particularly belong to the Orbitary Plate.

Whatever farther is neceſſary to the demonſtration of the Œthmoid Bone, is to be found in Plates V. and VI. where the cells are particularly well explained.

FIGURE V. AND VI.

EXPLAIN the SPHOENOID, PTEREGOID, or WEDGE-LIKE BONE; it is named Pteregoid from its reſemblance to a bat, and is ſo preſented here, as to ſuggeſt the likeneſs.

Figure V. ſhows the back view of the bone, *viz.* that which is turned towards the ſcull;—Figure VI. ſhows the front view, *viz.* that which is connected with the bones of the face.

Its Processes are,

1. The Alae, or wings, commonly named the Temporal Proceſſes, for they lie in the Temples; the Temporal Muſcles lie upon them, and their upper edge is ſquamous like the edge of the Temporal bone, and forms part of the Squamous Suture.

2. Marks that ſmooth ſurface of this Temporal Process, which, being turned towards the eye, enters into the Orbit, and ſo is named the Orbitary Proceſs of the Sphœnoid Bone.

3. The ſmall and ſharp Spinous Process.

4. The hook-like point of the Spinous Proceſs, which is often named the Styloid Proceſs.

5. The External Pteregoid Processes; which are two flat and broad plates.

6. The two internal Pteregoid Processes; which ſtand off a little higher, and more direct from the body of the bone; they are ſmaller; and terminate in a little hook. The Pteregoid Muſcles, which go to the lower jaw, ariſe from the proceſſes themſelves; and the Tensor Palati Muscle turns round this little hook.

7. The Azygous, or ſingle Proceſs; which is ſingle, becauſe it ſtands out from the middle of the bone. It forms part of the partition for the Noſe, and is thence named Nasal Process.

8. The

8. The two ANTERIOR CLYNOID PROCESSES.

9. The two POSTERIOR CLYNOID PROCESSES.

10. The ſpace bounded by theſe four CLYNOID PROCESSES; which, from reſembling a Turkiſh ſaddle, is named, SELLA TURCICA.

11. The two little wings of Ingraſias, called the TRANSVERSE SPINOUS PROCESSES.

The cells, which occupy the body of this bone, lying under the SELLA TURCICA, are to be ſeen at (*g*) Figure VI. and again in Plate VI.

The HOLES proceed next in order, and are marked alſo with a ſuit of numbers, that the demonſtration may be continued and entire.

1. (*a*) The two OPTIC HOLES, tranſmitting the Optic Nerves; which are the ſecond pair of the ſcull; for the firſt pair, *viz.* the Olfactory Nerves paſs through the Œthmoid Bone.

2. (*b*) The FORAMEN LACERUM; or wide hole, which permits the third, the fourth, the firſt branch of the fifth, and the ſixth pairs of Nerves to paſs; for all theſe are ſmaller nerves, deſtined for the Muſcles of the Eye, and enter thus at the bottom of the ſocket, while the ſecond pair is the proper Optic Nerve.

3. (*c*) The FORAMEN ROTUNDUM; it tranſmits the ſecond branch of the fifth pair which goes to the upper Jaw.

4. (*d*) Is

4. (*d*) Is the Foramen Ovale, (larger than the Foramen Rotundum) which tranſmits the third branch of the fifth pair, going to the lower jaw.

5. (*e*) The Spinous Hole, the Foramen Spinale, which is a ſmall hole in the very point or tip of the Spinous Proceſs. It is not for the tranſmiſſion of a nerve; but for the entrance of that ſmall artery which belongs to the Dura Mater, and which goes along the inner ſurface of the Parietal Bone, marking it with its furrow. A briſtle is paſſed through this hole in one ſide, to ſhow the courſe of the artery.

6. The ſixth Hole. The Pteregoidean, or Vidian Hole, is not to be ſeen in this view; but is to be ſeen in the next Plate, IV. where it is marked with its proper number, 6.

(*f*) Repreſents the rough ſurface where the cuneiform or wedge-like part of this Sphœnoid Bone has been broken off from the wedge-like proceſs of the Occipital Bone.

(*g*) Marks the Cells of the Sphœnoid Bone, which are occaſionally very large, as in this Bone; and which make all the bone hollow under the Cella Turcica.

(*h*) Shows where the Palate Bone had adhered to the Sphœnoid;—and the Palate Bone, being torn away, has broken, and left ſome of its ſmall cells ſticking here to the Sphœnoid Bone.

N. B. The Cells of the Palate Bone are explained in the next plate.

This Bone is connected;——at (*i*) Figure VI. with the Œthmoid Bone before;—at (*f*) Figure V. with the Os Occipitis behind;—at (1.) with the Temporal Bones in the Temples. The Spinous Proceſs (3.) is locked in betwixt the Temporal and Occipital Bones;——

Bones ;—and the Pteregoid Proceſſes (5.) are joined to the Palate Bone, and form the back of the Noſtrils. *Vide* next plate, where the Pteregoid Proceſſes are ſeen in their place.

FIGURE VII. AND VIII.

THE VII. and VIII. figures of this plate explain the UPPER JAW BONE ; Figure VIII. ſhowing its Internal Surface, viz. that next to the noſe, with the wide opening of the Antrum, or Great Cavity of the Jaw. Figure VII. ſhowing the outſide of the Bone, explaining the outſide walls of the Antrum, or Great Cavity : ſo that, by comparing the two ſides of the bone, one can eaſily underſtand the great extent of the Antrum, or Cavity ; and how pulling a tooth will open the way for matter flowing out from it.

1. The NASAL PROCESS which riſes up on each ſide to form the ſides of the noſe. The Arch forms the ſides of the noſe ; and the rough pointed ending of this Naſal Proceſs is connected with the Os Frontis.

2. Is the ORBITARY PLATE, or that plate which forms the floor of the eye, and the roof of the Antrum, or Cavity.

3. The MALAR PROCESS, or that broad rough ſurface upon which the Cheek Bone reſts.

4. The

4. The ALVEOLAR PROCESS, or that projecting ſemicircle, which holds the teeth; thence named Alveolar, or Socket Proceſs.

5. The PALATE PLATE, or Proceſs; of which we ſee the rough edge only, viz. that edge by which the Middle Palate Suture, the ſuture in the roof of the mouth, is formed.

N. B. The Palate Plate is ſeen full in Plates IV. V. and VI.

6. The ANTRUM MAXILLARE, or HIGMORIANUM. This great cavity appears with a very wide opening here in the naked bone; but this opening is covered in the entire ſcull, both by the lower ſpongy bone, and by the naſal plate of the palate bone. This naſal plate of the palate bone is left in this drawing covering a part of the Antrum; the reſt of this opening is naturally covered by a membrane, which leaves but one ſmall hole.

The Naſal Plate of the Palate Bone which is left ſticking upon the Antrum is marked (*a*).

(*b*) Marks the only Hole of the Upper Jaw Bone. It is named the Infra-Orbitary Hole. A chief nerve of the face comes out here, named (with its hole) the Infra-Orbitary Nerve.

The proper Infra-Orbitary Hole is marked (*b*); and the Canal by which the nerve comes down is marked (*c*): at this place the nerve lies under the eye, upon the floor of the orbit,—making a very large groove and hole upon this Orbitary Plate of the Upper Jaw Bone; for arteries running along bones do not make deeper grooves than the nerves do.

N. B.

N. B. This Infra-Orbitary Nerve is a chief branch of the Superior Maxillary Nerve.

(*d*) Marks the FORAMEN INCISIVUM; ſo named from its being juſt above the Inciſores or cutting teeth. It is alſo named Anterior Palatine Hole; it is complete only when the two jaw bones are joined, as in Plate IV. Fig. III. at (*l*) which marks this anterior Palatine hole.

(*e*) Marks the courſe of the Lachrymal Duct, or tube which conveys the tears, which, after having paſſed through the Os Unguis, makes this groove in the Naſal Proceſs of the upper jaw bone, and ends or opens into the Noſe juſt where this duct ends.

Etched by J Bell

Published for the author

PLATE IV.

This Plate explains the Text Book, from Page 85, to Page 104.

EXPLAINS the BONES of the FACE, and the LOWER JAW BONE.

FIGURE I.

REPRESENTS the two NASAL BONES, laid to each other in their natural direction; by which is explained,

1. The NASAL SUTURE; joining theſe two Naſal Bones to each other.
2. The SERRATED SURFACE, by which they are joined with the Os Frontis, at the roughneſs round the root of the Naſal Proceſs; which union forms part of the Tranſverſe Suture.
3. The ROUGH SURFACE, by which they are joined to the two cartilages that form the Alæ Naſi, or Wings of the Noſe.
4. The ROUGH SURFACE, by which they are fixed to the Naſal Proceſſes of the upper jaw bone.

FIGURE II.

EXPLAINS the OS UNGUIS, where both the drawings ſhow that ſurface which appears in the orbit; and in both of them is ſeen,

1. The

1. The plain ſurface upon which the eye rolls; and

2. The Groove which holds the Naſal Duct.

FIGURE III.

EXPLAINS, by a uſeful drawing, many very important parts on the baſis of the ſcull. (*a*) the Foramen Magnum: (*b*) the Condyle: (*c*) the two Pteregoid Proceſſes; (*d*) the Hook of the Inner Pteregoid Proceſs, ſhowing how the Tendon of the Circumflex Muſcle may twiſt round it: (*e*) the Styloid Proceſs: (*f*) the Mamillary Proceſs: (*g*) that part of the Palate, or roof of the mouth, which is formed by the upper jaw bones: (*h*) the ſmaller part of the Palate, formed by the proper palate bones; (*i*) the Middle Palate Suture: (*k*) the Tranſverſe Palate Suture: (*l*) the Anterior Palatine Hole, or Foramen Inciſivum: (*m*) the two Poſterior Palatine Holes, tranſmitting the nerves for the palate: (*n*) the Vomer, or bone forming the ſeptum or partition which divides the two noſtrils: (*o*) the two Upper Spongy Bones, *viz.* thoſe belonging to the Œthmoid Bone, hanging in their places high in the noſtrils: (*p*) the two Lower Spongy Bones, which are independent bones hung by a hook upon the ſide of the Antrum Highmorianum, and conſequently hanging very low in the noſtril.

FIGURES IV. V. AND VI.

EXPLAIN the PALATE BONES; where Figures IV. and V. ſhow the two Palate Bones ſeparated from each other, and from the other bones. Figure VI. ſhows the two Palate Bones joined. On theſe drawings, the ſame figures ſtill mark the ſame points,—the numbers marking Proceſſes, and the letters running under them marking as uſual the leſſer parts.

1. Shows

1. Shows the PALATE PLATE, or Procefs of the Palate Bones; and in FIGURE VI. the palate plates are joined, fo as to form the back part of the middle palate future: (*q*) is the broad rough furface by which the two palate bones are oppofed to each other, and which forms the Middle Palate Suture: (*r*) is the middle point, from which the Uvula, Pap, or Gurgulion hangs down.
2. Is the PTEREGOID PROCESS of the palate bones, having a little hollow into which the Pteregoid Proceffes of the Sphœnoid Bone are received.
3. Is the NASAL PLATES, which lie within the noftrils; and which, by lying flat upon the fides of the Antrum Highmorianum, clofe it in part.
4. Is the ORBITARY PROCESSES; for the Nafal Procefs lies up along all the fide of the noftril, and ends in a broader knob, which enters into the focket of the eye at its deepeft part, and is there named Orbitary Procefs.
5. Marks the Cell or Cells of the Palate Bone, which are in its Orbitary Procefs, and which are joined to thofe of the Sphœnoid bone.

FIGURES VII. AND VIII.

THE two SPONGY BONES.

FIGURE VII. Explains the rolled and fpongy appearance of the fpongy bone. It reprefents that furface which is turned outwards, *i. e.* towards the feptum of the nofe.

FIGURE VIII. fhows that flatter fide which is turned towards the Antrum Highmorianum, and clofes it; and the letter (*s*) marks the fmall point, or hook-like procefs, by which this lower fpongy bone is hung upon the edge of the opening into the Antrum Highmorianum. (*t*) is the fore end of the fpongy bone, which is turned forwards in the nofe, covering the lower end of the nafal duct; fo that in feeking to clear the duct with a probe, we muft pafs it under this point. (*u*) is the other end of the fpongy bone, which is turned backwards in the noftrils.

The

The poſition of the ſpongy bone in the noſtrils is well explained in Figure III. and the fore part of the ſame ſpongy bone is ſeen in Plate VI. Figure II.

FIGURE IX.

REPRESENTS the VOMER.

1. The GROOVE, in its upper part, by which it fits aſtride upon the Azygous Proceſſes of the Œthmoid and Sphœnoid Bones.
2. Its Lower Groove by which it ſits down upon the riſing point of the Maxillary and palate bones: and (*r*) Figure VI. ſhows how it ſtands upon the palate bones. The letter (*v*) Figure VI. ſhows the Great Groove turned upwards to be fixed to the Azygous Proceſſes of the Œthmoid and Sphœnoid bones, and the letter (*n*) Figure III. ſhows the Vomer in its right place in the noſe, dividing the noſtrils.
3. The Ragged Grooved Surface, which looks forwards and receives the plate of cartilage, which completes the partition betwixt the noſtrils.

FIGURE X.

REPRESENTS the CHEEK BONE.

1. Shows the Upper Orbitary Proceſs.
2. Marks the Inferior or Lower Orbitary Proceſs.
3. The Maxillary Proceſs.
4. The Zygomatic Proceſs; and
5. Marks the plate which forms the lower and fore part of the ſocket for the eye, and ſo is named the Internal Orbitary Proceſs.

FIGURES XI. AND XII.

EXPLAIN the lower jaw bone, in two views; but every Figure applies to each bone, and the Figures proceed in the order of the Text Book.

1. The CHIN; the lines comprehend the Chin in their courſe, and they terminate ſo as to mark the ſmall Mental Holes on both ſides of the Chin, where the nerves, after having furniſhed the teeth, come out upon the face.
2. Marks the line of the Baſe of the Jaw, extending from the Chin to the Angle.
3. Marks the Angle of the Jaw, which is irregular and knotty, by the inſertion of the great Maſſeter Muſcle.
4. The Coronoid Proceſſes of the jaw.
5. The Condoloid or Articulating Proceſſes; (*y*) the great hole which receives the lower Maxillary Nerve. We ſee here likewiſe the deep and wide groove that leads to the nerve; and another deep, but ſmaller groove, which ſhows where the nerve which belongs to the tongue, departs from the great nerve, and runs along the inner ſide of the jaw bone betwixt it and the tongue.
6. Is the ALVEOLAR or SOCKET PROCESS, with the teeth in it.

PLATE

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PLATE V.

This Plate explains the Text Book, in all the Chapters upon the Scull.

IS a general view of the CRANIUM,——explaining and connecting the demonſtrations of the individual parts.

FIGURE I.

IN this view, where the Cranium or Scull Cap is cut off, and the baſis ſeen from within, the thing that firſt ſtrikes the eye is,—the formal and regular diviſion of the Cranium into three hollows (1. 2. 3.); and each of theſe is like a ſtage or deck, the one lower than the other.

(1.) Is the fore part of the baſis of the Scull, the ſhalloweſt and moſt ſuperficial hollow. It is formed chiefly by the Frontal, Œthmoidal and Sphœnoidal Bones. It is marked with undulating lines, correſponding with the inteſtine-like convolutions of the brain. ——This diviſion ſupports the Fore Lobes of the brain, and gives paſſage to the Olfactory and Optic Nerves.

(2.) Is a large hollow, cup-like, deeper than the firſt;——lying under the temple;——formed chiefly by the wings of the Temporal and Sphœnoidal, and by the corners of the Frontal and Parietal Bones. This holds the Middle Lobes of the brain, contains the Petrous part of the Temporal Bone;—gives out all the ſmaller Nerves be-

longing to the Eye, and all the great nerves belonging to the Upper and Lower Jaws; it gives also the Auditory Nerves, which enter here into the Petrous Portion of the Temporal Bone.

(3). Is a stage lower still, being the deepest hollow of the three; is formed chiefly by the cup of the Occipital Bone, and by a small part of the Temporal Bones;—and as the Cerebellum supports the back lobes of the brain, this hollow may represent the back lobes, or the third division of the brain;—so this last hollow contains the Cerebellum; gives out the Lingual Nerves, which pass through a hole of the Os Occipitis; and sends out the Spinal Marrow through the Foramen Magnum, or Great Hole.

FIRST DIVISION.

In the first division are seen the parts and holes of the FRONTAL, ŒTHMOIDAL, and SPHOENOIDAL BONES.

FRONTAL BONE.

(*a*) Marks the Cancelli, or Diploe of the Frontal Bone so cut as to make the Cancelli appear very wide; bnt that proceeds from having cut the scull very low, which has taken off the outer layer of the Orbitary Process. (*b*) Marks the regular or proper Frontal Sinuses, which are thus understood to be like enlarged cells of the Diploe; while (*c*) shows a part of the cells going down into the Orbitary Plates: for the sinuses sometimes extend thus all over the eye, as in this scull; and the letter (*c*), while it points to this extension of the Frontal Sinus, is so placed as to mark the undulating forms, which the lobes of the brain give to this thin Orbitary plate of the Frontal Bone.

ŒTHMOIDAL

Œthmoidal Bone.

There is incaſed betwixt (*c c*) the Orbitary Plates of the Frontal Bone, the Cribriform plate of the Œthmoidal Bone;—where (*d*) marks the Cribiform Plate with its numerous ſmall holes for tranſmitting the Olfactory Nerves. (*e*) Marks the Criſta Galli, whence the Falx begins. (*f*) Points to that hole which is called the Blind Hole, which is as ſmall as a pin's point, and which belongs in common to the Œthmoidal and Frontal Bones.

N. B. The ſmall crack, to which the lines running downwards from (*d*) point, and which indicates the Suture ſurrounding the Œthmoidal Bone and named Œthmoidal Suture, can hardly be miſtaken.

Sphoenoidal Bone.

The Sphenoid Bone is known here by its two proceſſes named Transverse Spinous, or Little Wings of Ingrasias marked (*g*); the lines from the letter (*g*) point to the Sphœnoidal Sutures, which ſeparate this Bone from the Frontal and Œthmoid Bones. (*h h*) Mark the two Anterior ~~Œthmoid~~ Clinoid Proceſſes. (*i*) Marks the Poſterior Clinoid Proceſs; for it is rather one Proceſs terminating in two little horns or knobs. (*k*) Is ſet down in the Sella Turcica in the very centre of the Clinoid Proceſſes where the Pituitary Gland is lodged. (*l l*) Mark the two Optic Holes, which are ſcarcely ſeen, for they lie under the two Anterior Clinoid proceſſes, ſo as to be almoſt hidden by them: — The two lines going from the letter, (*m*) mark the two wide grooves, which are formed by the Carotid Arteries as they riſe by the ſides of the Sella Turcica; and the letter (*m*) itſelf ſits upon a large groove made by the Optic Nerves, where they enter into the Optic Holes.

SECOND DIVISION.

This diviſion ſhows points of the SPHOENOID alſo, but chiefly of the TEMPORAL BONE, and of the Corner of the PARIETAL BONE.

SPHOENOID BONE.

(*n*) Shows the Foramen Lacerum under the Wing of Ingraſias, by which all the ſmaller nerves enter into the ſocket for furniſhing the eye-ball. (*o*) Shows behind that, the Foramen Rotundum for the nerve of the upper jaw: (*p*) The Foramen Ovale for the nerve of the lower jaw:—and (*q*) ſhows the Spinous Hole, which is large here that it may be ſeen, (for naturally it is extremely ſmall), and the Groove, formed by the great artery of the Dura Mater as it enters by this ſpinous hole, is alſo ſeen here (*r*) marked very hard and ſtrong.

PARIETAL BONE.

It is upon the corner of the Parietal Bone, that this groove (*r*) is formed by the artery of the Dura Mater.

TEMPORAL BONE.

The point of the Petrous Portion of the Temporal Bone is ſeen here projecting into the baſis or floor of the cranium. The point of the triangular Petrous Portion is marked (*s*); and the Internal Auditory Hole, by which the auditory nerve or 7th nerve enters into the ear is marked (*t*).

THIRD DIVISION.

In this third diviſion nothing almoſt but the Occipital Bone is ſeen; and its parts are theſe.—(*u u*) The two great hollows in which the lobes of the cerebellum lie.——

(*v*) is the Ridge betwixt theſe two hollows, which riſes very high, is called the Internal Spine of the Occipital Bone, and has a ſmall falx (ſomewhat like the larger one) attached to it. (*w*) Marks the Foramen Lacerum, or wide irregular hole betwixt the Temporal and Occipital Bones, through which the Lateral Sinus paſſes to go down into the neck, where it forms the Great Internal Jugular Vein. And the 8th pair of nerves, or Par Vagum accompanies the vein through this hole.—(*x*) Stands upon the very middle of the Cuneiform or Wedge-like Proceſs of the Occipital and Sphœnoidal Bones; for the two bones meet here, without any determined or regular limits for either.—And (*y*) ſtands in the center of the Foramen Magnum, by which the Spinal Marrow goes down into the canal of the Spine.

FIGURE II.

THIS drawing explains the Baſis of the Scull, as it is turned towards the neck and throat. But this ſurface is ſo rough, irregular, and confuſed, that it will not bear that fair arrangement and complete enumeration of proceſſes which the firſt figure bears. The ſurfaces chiefly to be obſerved, and which may ſerve in ſome degree to arrange the ſubject, are 1*ſt*, The JAW and PALATE BONES. 2*d*, The Root of the TEMPORAL BONES. 3*d*, The LOWER PART of the OCCIPITAL BONES.

1. About the Palate we obſerve,

(*a*) The Alveolar Proceſs of the upper Jaw Bone, robbed of many of its teeth; (*b*) the Palate Plate of the Upper Jaw Bone, forming a chief part of the roof of the mouth; (*c*) the Palate Plate of the proper Palate Bone, which forms nearly one third of the Palate; (*d*) the Tranſverſe Palate Suture, which runs acroſs the Palate, joining the Palate Bone to the Palate Proceſs of the Jaw Bone; (*e*) the Middle or Longitudinal Palate Suture, which joins the bones of the oppoſite ſides; (*f*) the Foramen Inciſivum, or Anterior Palatine Hole, lying juſt behind the firſt cutting teeth, and common to both bones; (*g*) the poſterior Palatine Hole, which permits the

the Palatine Nerve and Artery, to come down from the back of the noſtrils to the Palate.

The backs of the noſtrils are formed by the riſing plates of the proper Palate Bones, and by the Pteregoid Proceſſes. At the back of the noſtrils, we ſee, (*h*) the Vomer, ſo named from its reſemblance to a plough-ſhare, and ſtanding exactly in the middle, for it is the partition of the noſe; (*i*) the Outer Pteregoid Proceſs, forming the back of the noſtrils; (*k*) the Hook of the Inner Pteregoid Proceſs, upon which the tendon of the Tenſor Palati Muſcle turns: and a ſmall tip of the Palate Bones, which is at this point covered by theſe Pteregoid Proceſſes of the Sphœnoid Bone, is named, the Pteregoid Proceſs of the Palate Bone. And (*l*) marks the appearance outwardly of the Wedge-like Proceſſes of the Occipital and Sphœnoidal Bones.

2. About the roots of the Temporal Bones we have,

(*m*) the Root of the Zygomatic Proceſs, where the Condyle of the lower Jaw plays; and (*n*) the Ridge juſt before the Condyle, upon the top of which the Condyle ſtands, in a dangerous ſituation, almoſt out of its ſocket when the jaws are opened wide; and which it ſlips over, getting into the hollow for the Temporal Muſcle, when the lower jaw is diſlocated. (*o*) Is the Mamillary, and (*p*) the Styloid Proceſs, of the Temporal Bone. (*q*) Is the Oval Hole of the Sphœnoid Bone, for tranſmitting the great nerve of the lower jaw. (*r*) Is the Spinous Hole of the Sphoenoid Bone, for admitting the artery of the Dura Mater. (*s*) Is the hole near the point of the Temporal Bone, for the Carotid Artery. (*t t t*) The Crucial Ridges of the Os Occipitis.—(*u*) The Poſterior Tuber, or the Acute and Prominent Point of the Occipital Bone.—(*x*) The Additamentum Suturæ Lambdoidalis, which joins the back corner of the Temporal to the Occipital Bone.

The Zygoma, as formed by the Zygomatic Proceſſes of the Temporal Bone, and of the Cheek Bone, is marked (*y*); and the hollow under the Zygoma for lodging the Temporal Muſcle and the branch of the lower jaw to which that muſcle is attached, is marked (*z*); and is ſeen in this view on both ſides full and large.

PLATE

SUPPLEMENTARY EXPLANATION TO PLATE V. OF THE BONES.

HAVING, in doing the outline to this plate, found it poſſible to mark the points more correctly, I have added the following explanations in this ſupplementary page; and that they may unite eaſily with the firſt explanation, I repeat the eſſential points.

In the Upper Scull there are,

1. The Optic hole (*l*).
2. On each ſide of the letter (*m*), there is the likeneſs of a ſecond Optic hole, but it is merely the impreſſion which the laſt turn of the Carotid Artery makes.
3. (*n*) Is the Foramen Lacerum.
4. (*o*) Is the Foramen Rotundum.
5. (*p*) Is the Foramen Ovale.
6. (*q*) Is the Spinous Hole.
7. (*z*) Marks the round hole by which the Carotid Artery enters the ſkull, after winding through a crooked canal in the Temporal bone, about an inch in length.
8. The figure (8.) points to a great breach in the rocky part of the Temporal bone; this breach is occaſioned by the falling away of the Cartilaginous part of the Euſtachian Tube. Therefore this wide breach is found in every Church-yard ſcull; and the hole for the Carotid Artery marked (*z*), opens where this breach ends.
9. It is obſerved of the great hole marked (*w*), for the paſſage of the Jugular Vein, that it is large and irregular; that it is almoſt divided into two openings, by a ſmall projecting point; the line extending from the letter (*w*), touches exactly this ſmall point.

point. The eighth pair of nerves passes in the smaller opening before the point, the Jugular Vein passes in the greater opening behind it; a small bridle of the Dura Mater goes across from this point, and makes the two holes distinct in the fresh scull, and defends the eighth pair of nerves from the pressure of the Jugular Vein, when (as often happens) it is turgid with blood.

10. The number (10.) marks the hole under the Condyle by which the ninth pair of nerves, the Lingual Nerve goes out.

In FIGURE II. the chief points are these,

(*f*) Marks the Anterior Palatine Hole.

(*g*) Marks the Posterior Palatine Hole.

(*h*) The Vomer, or bone forming the partition of the nose.

(*i*) The outer Pteregoid Process.

(*k*) The Inner Pteregoid Process.

(*l*) The Cuneiform Process of the Occipital Bone.

(1.) Marks the Foramen Lacerum, not that which is marked (*n*) in figure i. but another Foramen Lacerum belonging also to the orbit, not for the transmission of nerves, but for the lodging of fat.

(*q*) Marks the Foramen Ovale.

(*r*) The Spinous Hole.

(2.) Is that great breach which is left by the fading of the Cartilaginous end of the Eustachian Tube.

(*s*) Is the hole for the passage of the Carotid Artery, which as on the inside of the scull opens immediately behind the breach.

(3.) Marks the great Thimble-like hole, by which the Lateral Sinus comes out from the Scull, to form the great Jugular Vein.

(4.) Is a hole seated behind the Condyle, the hole marked (10.) in figure i. is before the Condyle, and gives passage to the ninth or Lingual pair of nerves; this smaller hole is behind the Condyle, and gives passage to a small vein of the neck.

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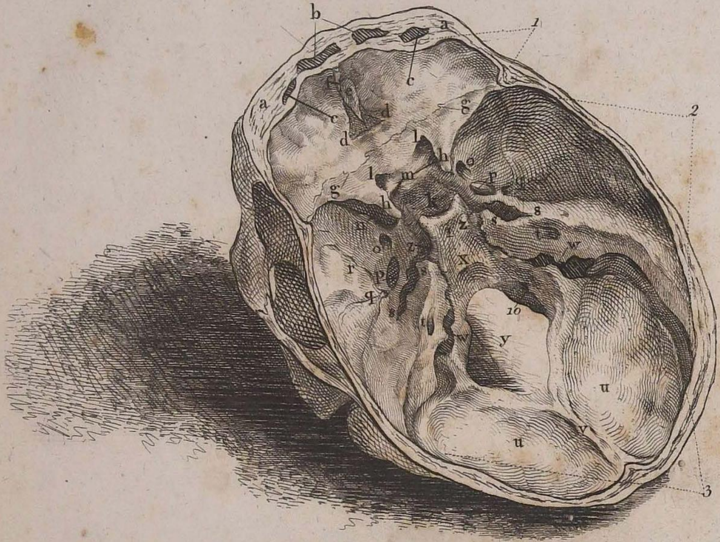

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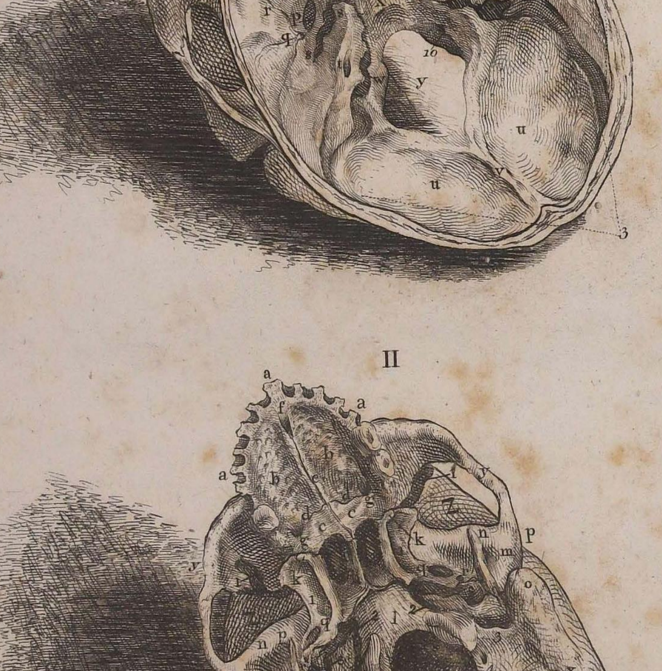

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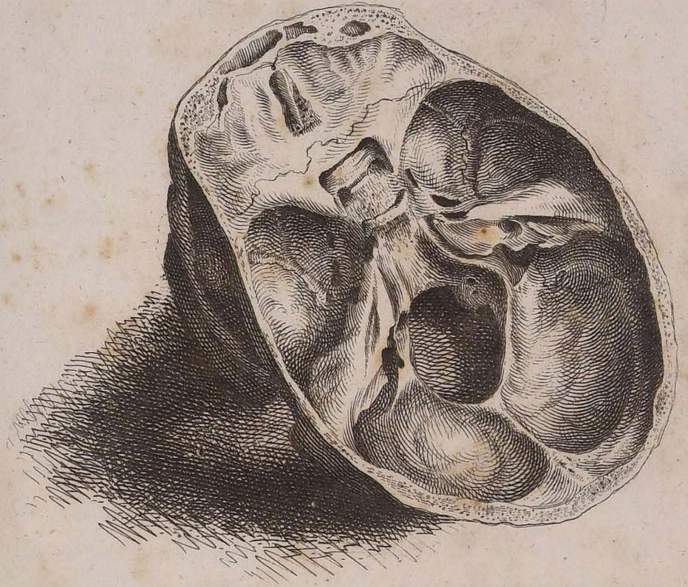

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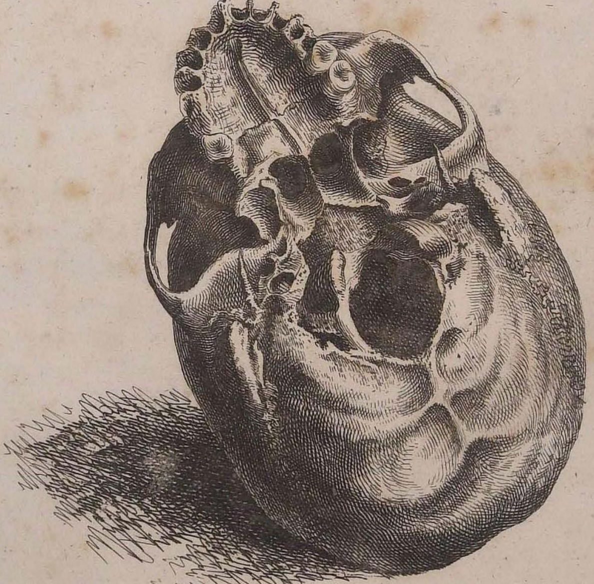

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PLATE VI.

This Plate explains the Text Book, in all the Chapters upon the Scull.

GIVES 1*ſt*, a general view of the CRANIUM, the reverſe of the firſt plate; and 2*d*, a vertical ſection of the Cranium, which ſhews the relation and bearing of many important parts,—explains particularly the great train of ſinuſes or cells, which make all the baſis of the Cranium hollow,—explains alſo the ſpongy bones,—the Antrum Highmorianum,—the Naſal or Lachrymal Duct,—and the Mouth of the Euſtachian Tube, which is ſeen here ſtuffed out, and dried, to make its opening immediately behind the noſtrils at the back of the palate more diſtinct.

FIGURE I.

OUTSIDE OF THE SCULL*.

A THE OS FRONTIS; where (*a*) marks the bump of the Frontal Sinus; (*b*) The Superciliary Ridge, dotted with marks of its Nutritious Arteries; (*c*) The Superciliary Notch, and hole which the Frontal Nerve and Artery make.

B The

* Let the reader remember that there cannot be a perfect correſpondence of figures through all the plates; that no more could be attempted in the anatomy of the Bones, (a ſubject ſo irregular) than juſt to make

B. The Parietal Bone, and the letter is ſo placed as to mark that ſemicircular ridge where the Temporal Muſcle ariſes.

C. Marks the Temporal Bone. Where (*d*) marks the Meatus Auditorius; (*e*) the Maſtoid Proceſs; (*f*) the Zygoma; and (*g*) a Double Squamous Suture, as in the ſcull from which this was drawn.

D. Marks the Cheek bone where all its connections are ſeen; (*h*) with the Temporal bone; (*i*) with the Frontal Bone; (*k*) with the upper Jaw Bone.

E. Marks the Wing of the Sphœnoid Bone, where it lies in the Squamous Suture; and the four corners of bone forming the Squamous Suture, are (*l*) the corner of the Sphœnoid (*m*) the corner of the Parietal; (*n*) the corner of the Temporal; and (*o*) the Corner of the Frontal Bone.

F. Marks the Small Bone of the Noſe, where the middle Naſal Suture is ſeen.

G. Points to the Upper Jaw Bone. The letter is placed upon the Alveolar or Socket Proceſſes; and the ſmall letter (*p*) marks the Infra Orbitary Hole.

H Marks the Lower Jaw Bone, this letter touching the point of the chin; while the ſmall letter (*q*) marks the line of the baſis of the lower jaw; (*r*) the mark of the Maſſeter Muſcle, the point into which it is inſerted; (*s*) the Mental Hole by which a twig of the lower Maxillary Nerve comes out upon the face, juſt as the twig of the upper Maxillary Nerve comes out upon the face by the Infra Orbitary Hole, at (*p*).

In the Orbit, (*t*) marks the holes, which being within the orbit, (for arteries and nerves paſſing down into the noſtril,) are called Internal Orbitary Holes, to diſtinguiſh them from the Supra Orbitary and Infra Orbitary Holes. Of theſe internal Orbitary Holes,

make each plate ſyſtematic and orderly in itſelf, without reference to any other plate. And ſo in each plate the great letters point to the general Bone, and the leſſer alphabet marks and arranges the individual parts.

Holes, one is named the ANTERIOR, the other is named the POSTERIOR, Orbitary Hole. So that in this drawing, there are feen all the holes around the Orbit, *viz.* (*r*) The Supra Orbitary Hole, or Superciliary Hole; (*p*) the Infra Orbitary Hole; and (*t*) the internal Orbitary Hole. In the orbit is feen (*u*) the Tranfverfe Suture on the right fide pure; on the left fide alfo it is feen, but appears very irregular as it really is, for it joins together a great many irregular bones.

Within the orbit fome other parts are alfo feen here, which are not fo well explained in any other plate.—The whole conftitution of the orbit is feen;—(1.) Marks the Os Unguis in its plain part, where the eye rolls upon it.—(2.) Marks the Groove of Os Unguis, where the nafal duct lies; (3.) the Os Planum, which is in fact the plain fide of the Œthmoid bone as feen Plate III. Fig. III. at (*e*.) (4.) Is the Orbitary Procefs of the Upper Jaw Bone. (5.) Is the Orbitary Procefs of the Sphœnoid Bone, which is exactly oppofite to its Temporal Ala or wing (E.) (6.) Is the Orbitary Plate of the Frontal Bone, which forms far the greater part of the Orbit; and (7.) at the bottom of the Orbit is the Optic hole.

In the Nofe, the letter (*v*) denotes the Vomer, the bone which forms the partition of the Nofe.

FIGURE II.

THE VERTICAL SECTION OF THE SCULL.

A IS the Frontal Bone; where (*a*) marks the Coronal Suture feen from within like a mere crack, and not ferrated or zig-zag, as on the outer furface of the fcull; (*b*) marks the fmall projecting Spine, to which the falx is attached, and which projects fometimes half an inch, making it impoffible to trepan fafely at this point; (*c*) the Orbitary Procefs, or plate, which lies over the eye; (*d*) the Bump mark-

ing the Frontal Sinus or cavity. (1.) The cavity or ſinus itſelf, with a croſs bar in it, as there commonly is.

B The Inner Surface of the Parietal Bone; with the Artery of the Dura Mater, or rather its impreſſion or furrow ſeen.

C The Inner Surface of the Occipital Bone; where (*e*) marks the Winding Groove of the Lateral Sinus; (*f*) that Groove ending in the thimble-like cavity, and the thimble-like cavity ending in its turn in the Foramen Lacerum, by which the ſinus gets out; and there paſſes along with it through this wide ſlit, the Par Vagum, or eighth pair of nerves. (*g*) Marks the thickneſs of the bone, at the place of the Crucial Ridge; (*h*) its thinneſs, where it is loaded and preſſed by the lobes of the brain. (*i*) Shows the ſection of the Foramen Magnum. (*k*) Marks the Cuneiform Proceſſes of the Occipital and Sphœnoidal Bones *.

D Marks the Temporal Bone, where (*l*) points out the Foramen Auditorium Internum, where the Auditory Nerve enters; and (*m*) marks the Styloid Proceſs.

G Marks the Upper Jaw Bone, where it forms the Palate.

H Marks the Lower Jaw Bone, where (*n*) is the ſection, ſhowing the Cancelli of the Lower Jaw; (*o*) is the angle; and here upon the internal ſurface of the angle, the Pteregoid Muſcle is implanted; (*p*) the hole by which the proper nerve of the Lower Jaw, the inferior Maxillary Nerve, gets into the heart of the bone; and there going round, accompanied with an artery, a branch of each is given off to every tooth; and what remains of the Nerve and Artery after this, comes out by the Mental hole upon the chin.

The curious parts ſeen in this ſection are;—The CELLS, SPONGY BONES, and the EUSTACHIAN TUBE.

The

* There are two Foramina Lacera or wide holes, one belonging to the Sphœnoid Bone, in the bottom of the ſocket for the eye; and this one betwixt the Temporal and Occipital Bones, in the baſis of the Scull over the neck or implantation of the vertebræ.

The Cells are marked (1, 2, 3;) for (1.) Marks the beginning of this long train of cells, being the cells of the Frontal Bone, commonly called the Frontal Sinuſes, communicating with each other, and with the noſe. (2, 2, 2,) Mark the Cells of the Œthmoid Bone lying under the Cribriform Plate, and ſeen here by the cutting away of the Os Planum. (3.) Marks the Great Sinus of the Sphœnoid Bone. It was pretty large in this ſcull, and is known to belong to the Sphœnoid Bone, by the Sella Turcica and Clynoid Proceſſes, which are ſeen in profile above it.

(*q*) Marks the back part of the Septum Naſi left; and looking paſt that, into the noſtril, the Spongy Bones are ſeen; (*r*) the Upper Spongy Bone is already deſcribed as a mere proceſs of the Œthmoid Bone, hanging thus downwards into the top of the noſtril: (*s*) the Lower Spongy Bone, is an independent ſeparate bone; ſmall, as is expreſſed Plate IV., and hooked upon the edge of the Antrum Maxillare at this part; the opening of the Antrum is here marked (*s*).

The Lachrymal Duct is marked by the probe, (*t*) paſſed upwards from the noſtril, and it is ſeen, by the direction of this probe, that the duct opens into the noſe, juſt under the point of the Lower Spongy Bone.

The Euſtachian Tube is a large internal paſſage to the ear; which opens at (*u*) juſt behind the back part of the Palate, and at the back opening of the noſtril: here it is well expreſſed, the drawing being taken from a ſcull which had the cartilaginous opening of the tube ſtuffed out and dried.

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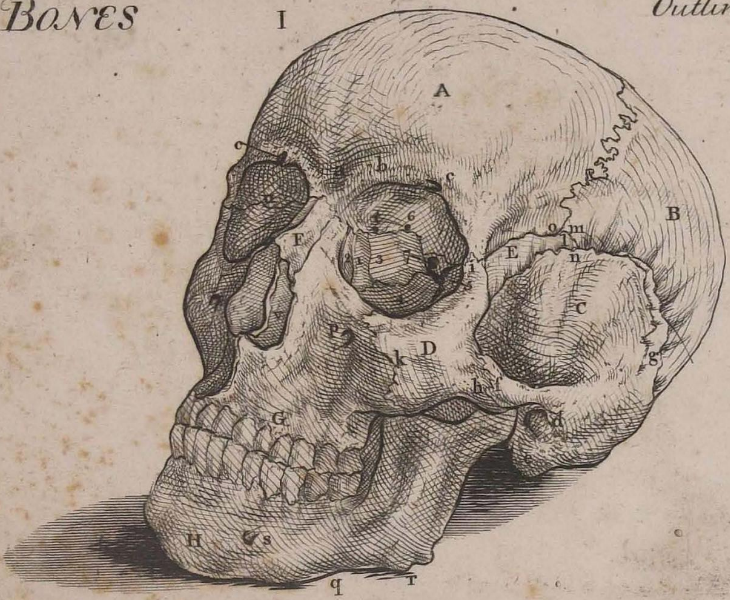

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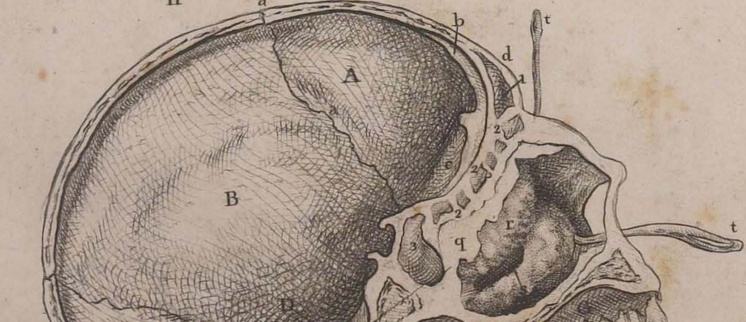

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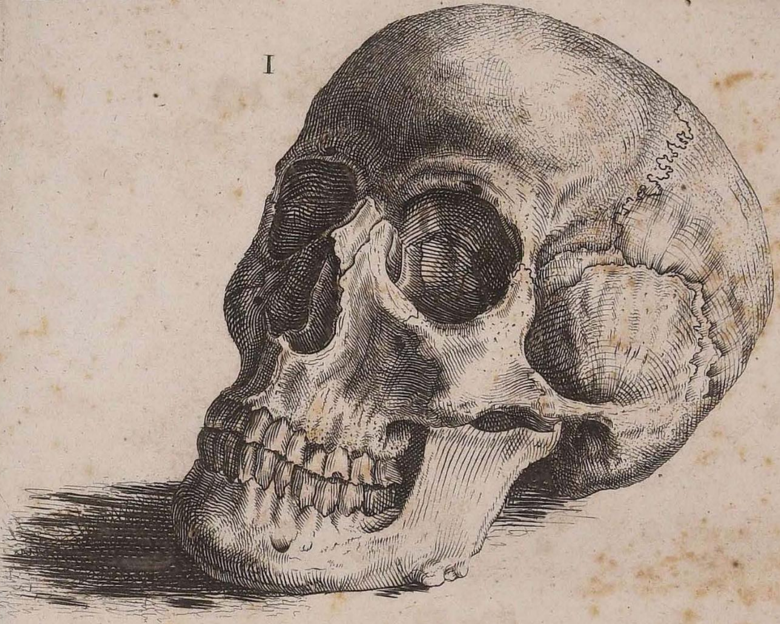

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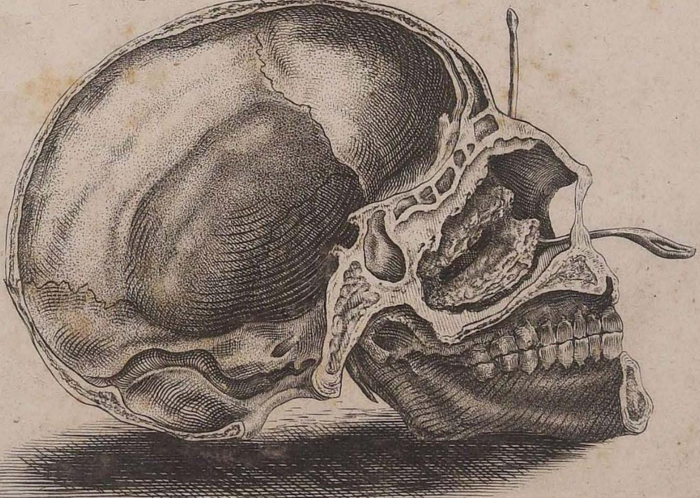

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PLATE VII.

This Plate explains the Text Book, from Page 105, to Page 129.

EXPLAINS the VERTEBRÆ, with all their proceſſes and parts; and as the ſame parts return in each Vertebra, the ſeveral Vertebræ ought to be explained rather, by ranks and orders, than as individual Bones.

FIRST ROW.

The firſt row, conſiſting of Figures I, II, and III, is drawn for the purpoſe of contraſting the three claſſes of Vertebræ, viz. the Vertebræ of the Back, of the Neck, and of the loins.

FIGURE I.

REPRESENTS a Vertebra of the Loins; and the peculiarities of the Lumbar Vertebræ are theſe.

(1.) The body is large and broad, thick, ſpongy and looſe in its texture, and tipped with a ring, (*a*) of harder bone.

(2.) The Articulating Proceſſes, or, as they are called, the Oblique Proceſſes, are large, for they have to bear much force; they ſtand directly upwards and downwards; the

four

four Articulating Proceſſes, (the two upper, as well as the two lower,) are marked 2, 2.

(3.) The Spinous Proceſs, is ſhort, flat, very broad, and ſtands horizontally and directly out, ſo as not to embarraſs the motions of the loins.

(4.) The Tranſverſe Proceſs is ſhort, direct, and very ſtrong; and the Articulating Proceſſes (2, 2) go off from the root of it.

In each Vertebra, there is formed by the roots of the Tranſverſe and Oblique Proceſſes, where they ariſe from the body, a ring or circle of Bone, which is in each drawing marked (*); it is for containing the Spinal Marrow.

FIGURE II.

IS a VERTEBRA of the BACK; where,

(1.) The body is ſhorter, and is a large ſegment (viz. nearly two thirds) of a ſmall circle.

(2.) The ARTICULATING PROCESS is ſmall and flat, and a little inclined, but not very oblique.

(3.) The Spinous Proceſs is long, aquiline, depreſſed to ſuch an angle that the two Spinous Proceſſes almoſt touch each other, (as is ſeen in Fig. IV.) (3. 3.) and allow of but a very limited motion.

(4.) The Tranſverſe Proceſs is long, ſtands directly outwards, or is inclined a little upwards, and upon every dorſal vertebra there are two marks for the articulation of the ribs; one (*b*) on the ſide of the vertebra itſelf, or rather betwixt the bodies of two vertebræ, for the proper head of the rib, (Fig. X. and XI.) (1.); and again there is another articulating ſurface (*c*) upon the face or fore part of the Tranſverſe Proceſs, which is for the articulation of the little knob (Fig. X. and XI.) (3.) upon the back part of each rib.

FIGURE

FIGURE III.

THE CERVICAL VERTEBRA has theſe chief characters,

(1.) The body is ſmall, firm, and of more ſolid and condenſed bone than in the vertebræ of the loins or back.

(2.) The Articulating Proceſs is truely oblique.

(3.) The Spinous Proceſs is ſhort, and is forked.

(4.) The Tranſverſe Proceſs is ſhort, forked, and has a large hole in it for a great artery of the brain, which by its paſſing through this canal of the vertebræ is named Vertebral Artery.

SECOND ROW.

This Row explains chiefly the connections of the VERTEBRÆ.

FIGURE IV.

SHows the manner in which one Dorſal Vertebra fits down upon another, ſo that the Articulating Proceſſes (2. 2.) check upon one another, and the Spinous Proceſſes (3, 3) are ſeen to be long and aquiline, and lying ſo over each other as to prevent all motion backwards or forwards, while the ribs limit the motion to either ſide. But in this drawing the one Spinous Proceſs is tilted up from the other a little, owing to the want of that intervertebral ſubſtance which ſhould lie betwixt the bodies. The hole is ſeen here at (*d*) betwixt the two vertebræ, by which a nerve goes off at the interſtice between each Vertebra: ſo there are in all twenty-four nerves of the Spine, correſponding with the number of Vertebræ in the Spine.

FIGURE

FIGURE V.

TWO Dorſal Vertebræ are here ſeen in their right poſition, connected by the intervertebral ſubſtance; with the end of one rib in its place; and at (*b*) is ſeen one articulating ſurface on the body of the vertebra naked. At (*c*) is ſeen the articulating ſurface, upon the face of the Tranſverſe Proceſs, naked. At (*d*) is ſeen the head of the rib covering the two articulating ſurfaces; connected at (*e*) with the body, and at (*f*) with the Tranſverſe Proceſs of its own vertebra.

FIGURE VI.

IS a drawing of the INTERVERTEBRAL SUBSTANCE, which is of that ambiguous nature, that anatomiſts chooſe this name, to avoid the dilemma of calling it either Cartilage or Ligament, when it has not the character diſtinctly either of Cartilage or of Ligament. It is ſhown here as it is found betwixt the Lumbar Vertebræ; and the concentric circles of which it conſiſts are better expreſſed towards the margin (*g*); but towards the centre, and eſpecially in the very middle, it becomes ſoft, pulpy, the circles confuſed. The ſubſtance is ſo much ſofter in the centre, that there is almoſt a hole at (*h*); eſpecially when the bone is allowed to ſpoil a little, as this one was. At (*i*) is ſeen a ſlight indication of the Spinal marrow, (which was alſo corrupted,) going down through the great hole of the vertebra.

THE THIRD ROW.

Explains the forms of the ATLAS and DENTATUS; the two Vertebræ by which almoſt all the motions of the head are performed. Fig. VII. explains the Atlas; Fig. VIII. explains the Dentatus; Fig. IX, ſhows the way in which the Atlas ſits down upon the tooth-like proceſs and oblique ſhoulders of the Dentatus.

FIGURE

FIGURE VII.

EXPLAINS the Atlas, or firſt Vertebra, where we find,

(1.) The body entirely wanting, and the place of the body ſupplied by Articulating Surfaces (2, 2), ſo large as to give ſufficient ſtrength and thickneſs to the ſides of the ring.

N. B. At the place where the body ſhould be, there is at (*k*) a ſmooth Articulating Surface for the Tooth-like Proceſs of the Atlas rolling. There is at (*l*) a little tip or point, which is tied by ligaments to the margin of the Occipital Hole; at (*m*) there is a ſort of ſtraitening in the ring, and at this point a ligament goes acroſs the ring, dividing it into two, and holding firm the tooth-like proceſs.

(2.) The Oblique or Articulating Proceſſes of this vertebra are oval, and of a converging form; and this peculiarity in their direction limits the motions of the head, ſo that it cannot turn, but only nod, upon the Atlas.

(3.) The Spinous Proceſs is wanting. A ſmall knob repreſents the ſpinous proceſs; and the want of this ſpine enables the Atlas to turn freely in circles upon the Dentatus.

(4.) The Tranſverſe Proceſs, alſo ending in a little knob, and perforated by the large hole for the Vertebral Artery.

FIGURE VIII.

THE DENTATUS, where the points of deſcription are,

(1.) The whole body of the Vertebra, riſing gradually towards the apex or point of its axis or tooth-like proceſs, which is marked (*m*).

(2.) The broad flat articulating ſurfaces, like ſhoulders, at the root of the tooth-like proceſs; upon which the atlas reſts and turns.

(3.) The Spinous Procefs is fhort, thick, and forked.

(4.) The Tranfverfe Procefs fhort, knobby, and perforated with the Vertebral Hole.

(*n*) Marks the Neck or Collar, the narrow part of the Tooth-like Procefs, where it is embraced by the Atlas;——and (*m*) marks the Apex or pointed extremity of the Tooth-like Procefs.——(*o*) Shows how deep the ring of this particular vertebra is, and how fairly triangular its great hole for the paffage of the fpinal marrow is.

FIGURE IX.

EXPLAINS the manner of connection betwixt the ATLAS and the DENTATUS; fhows the ring of the Atlas fet down upon the fhoulders of the Dentatus;——and here all the parts are marked with the fame numbers as in the other drawings.

FIGURE X. AND XI.

ARE DRAWINGS OF THE RIBS: where we fee,—(1.) the Head of the Rib, by which it is joined to the body of the vertebra.——(2.) The Neck or ftraitning beyond the head.—(3.) The Tubercle by which it is articulated with the Tranfverfe Procefs.——(4.) Another little Tubercle, beyond this fecond articulating furface.——(5.) The Angle of the Rib, or the point from which it begins to bend forwards, (*p*) the Groove in which the intercoftal artery lies. (*q*) The more fpongy end of the rib, with a fort of rude focket, which receives the cartilage that joins it to the fternum.

FIGURE XII.

REPRESENTS the WHOLE LENGTH of the STERNUM.

(1.) Marks the Upper Part of the Sternum; where (*r*) fhows the pointed part of this

firft

firſt bone turned downwards to meet the ſecond piece of the Sternum. (*s*) Is a hollow which makes way for the Trachea, &c. (*t t*) Are two articulating ſurfaces, by which the clavicle of either ſide is joined to this piece of the ſternum.

(2.) The ſecond piece of the Sternum, of great length, receiving the cartilages of moſt of the ribs; and the ſockets for receiving the cartilages are ſeen, though not very fully all along its edge at (*u u*) &c.

(3.) Is the Enſiform Cartilage, which in moſt bodies is ſtraight pointed, as in this drawing, but ſometimes bifurcated;—ſometimes bent down, or on the contrary turned remarkably upwards; very ſeldom oſſified, except in thoſe perſons who are exremely old.

Etched by J Bell

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PLATE VIII.

This Plate explains the Text Book, from Page 105, to Page 147.

IS a general view of all the BONES OF THE TRUNK. It is chiefly ufeful by fhowing the general pofition of Bones which have been already minutely explained, and requires only a very loofe and general explanation, becaufe it is a general plate merely, upon which the parts and proceffes need not be minutely told.

A The Ring of the firft Vertebra or Atlas.

B The Tip of the Tooth-like Proceffes of the Dentatus.

C The Bodies of the Cervical Vertebræ.

D Their Tranfverfe Proceffes.

E The Holes betwixt the Vertebræ, by which the Cervical Nerves come out from the canal of the fpinal marrow.

F The Firft Rib, lying flat and level here; and it is at this place, betwixt the clavicle and the firft rib that the fubclavian veffels come out.

G The General Convex of the Thorax, formed by the middle of the ribs.—(*a a a*) Mark the ends of the ribs which receive the cartilages, by which the ribs are joined to the fternum.

G Marks the Seven True Ribs.

H Marks the 3 firſt Falſe Ribs, whoſe cartilages run into the cartilage of the ſeventh rib.

I Marks the Two Looſe or floating Ribs, whoſe cartilages do not join the other cartilages, nor are united to the ſternum; but ſtand out in the flanks, free and independent, their cartilages being buried in the thick fleſh of the abdominal muſcles.

K The Cartilages of the Ribs.

L The Firſt or triangular piece of the Sternum.

M The Second or long piece, which receives almoſt all the Cartilages.

N The Third peice, as it is uſually called; though it is merely Cartilage, to extreme old age.—This 3d piece N is the Cartilago Mucronata, Enſiformis, or Swordlike.

O The Clavicle, or Collar Bone, as it lies upon the top of the cheſt; and here it is ſeen how the bone by its proper poſition, keeps off and ſupports the ſcapula or ſhoulder-blades.

P Marks the lower border of the Scapula. (*b*) Marks the Acromion Proceſs, to which the Clavicle is connected.—(*c*) is the Glenoid or Articulating Cavity, for holding the ſhoulder bone; (*d*) is the Caracoid Proceſs, ſhowing how it projects on the inſide of the joint, in the hollow under the arch of the Clavicle.—It is plain from this poſition of the proceſs, that it ſhould be felt on the breaſt juſt above the border of the Axilla.

Q The bodies of the Lumbar Vertebræ, thick and maſſy to ſupport the weight of all the parts above.

R The Tranſverſe Proceſſes of the Lumbar Vertebræ, (*dd*) touch the Spinous Proceſſes, where they appear in the interſtices of the Tranſverſe ones.——(*eee*) Mark the intervertebral ſubſtances, or rather repreſent the putty, which is put betwixt the Vertebræ (in making our ſkeleton) to ſtand, in place of the intervertebral ſubſtance.

S The Os Sacrum; where (*ff*) repreſent the holes of the Sacrum diſpoſed regularly in pairs.—(*gg*) Repreſent the white lines, which were cartilaginous in the child dividing the Sacrum into five pieces, but are now conſolidated into white lines of prominent bone particularly hard and firm.——(*h*) Repreſents the joining of the Sacrum to the Os Ilium at either ſide, which joining is named the Sacro-Iliac Symphyſis.

T That

T That diviſion of the Os Innominatum, which is called the Os Ilium; where (*i*) marks the hollow boſom of that expanded wing, which lying obliquely outwards like the wing of a chariot, is called the Ala Ilii: the Iliacus Internus Muſcle, ariſes from this ſurface.—(*k*) Is the circle called the Spine or Ridge of the Os Ilium.—(*l*) Is the ſudden ſharp point, by which the Spine ends, and which is there named the Spinous Proceſs, to which the name Anterior is added, to diſtinguiſh it from others, which lie concealed in the joining with the Sacrum. This Anterior Superior Spinous Proceſs has another under it ſmaller and marked (*m*), which is called the Anterior Inferior Spinous Proceſs.—It is merely a ſmall Bump, over the top of the ſocket for the origin of the Rectus Muſcle. (*n*) Marks the back or Dorſum Ilii, from which the Glutæi Muſcles ariſe.

U U Theſe two letters interſect all that part of the Os Innominatum, which is called Iſchium; where (*o*) marks the body of the bone, where it forms a chief ſhare in the ſocket. (*p*) Marks the Spinous Proceſs, which is ſeen through the opening of the Pelvis projecting towards the Sacrum.—(*q*) Marks the Tuberoſity or Bump of the Os Iſchium, the loweſt point of the Pelvis, and the part upon which we reſt in ſitting; and (*r*) marks the Ramus, or branch of the ~~Pubis~~ Ischium, as it riſes to meet a like branch of the Pubis.

V Marks the third piece of the Os Innominatum, *viz.* the Pubis;—where (*s*) is the body, where it forms part of the ſocket for the thigh-bone;—(*t*) the higheſt point named Criſta Pubis;—(*u*) points to the Symphiſis Pubis, or joining of the oppoſite bones;—(*v*) marks the leg of the Pubis, deſcending to meet the leg of the Iſchium. The Rami of the Iſchium and of the Pubis form, with the other parts of the Os Innominatum; firſt the Arch of the Pubis;—ſecondly, the Thyroid Hole; and the Rami are ſaid to meet one half belonging to the Pubis, and one half to the Iſchium, becauſe they are in fact ſeparate in the child; a clear tranſparent cartilage, being interpoſed betwixt them.—(*x*) Marks this Thyroid Hole; and (*y*) marks the Acetabulum or ſocket for the thigh bone.

PLATE

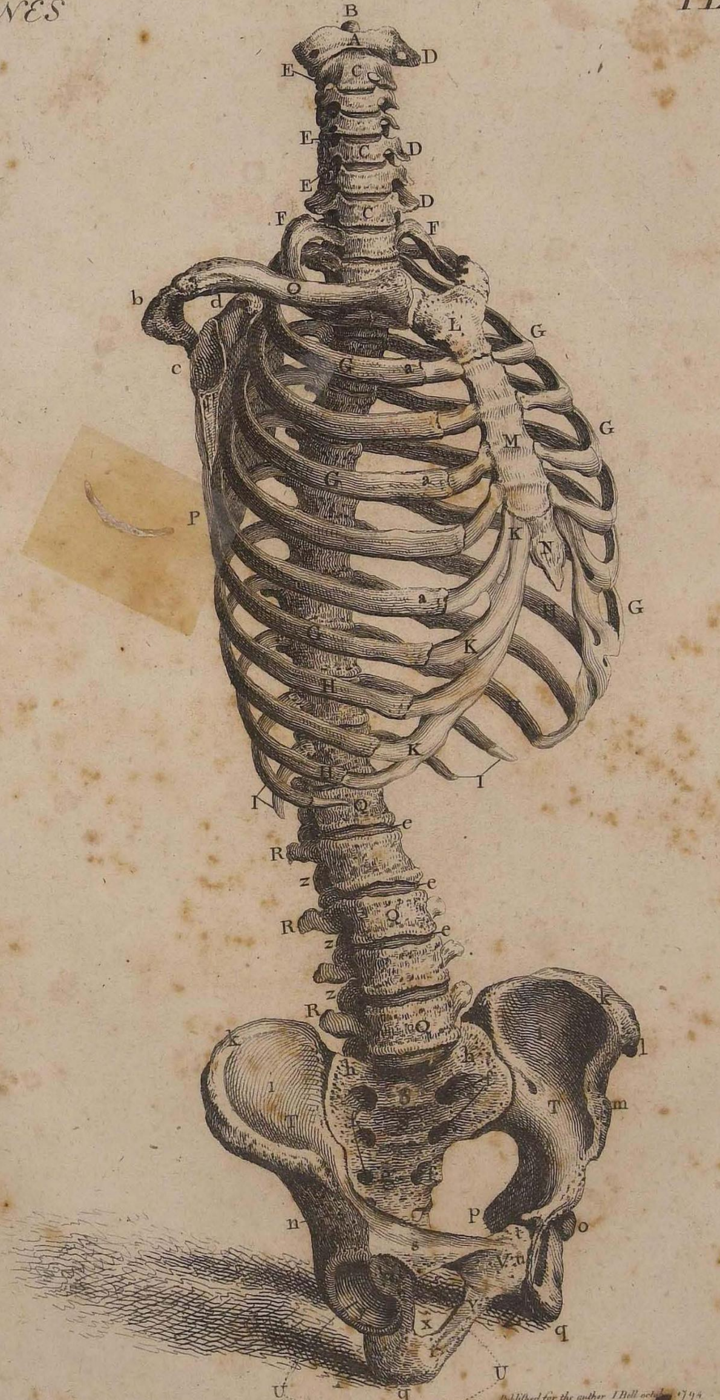

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PLATE IX.

This Plate explains the Text Book, from Page 147, to Page 158.

REPRESENTS the THIGH BONE, TIBIA, and FIBULA.

FIGURES I. AND II.

REPRESENT the fore and back views of the THIGH BONE.——And in order that the letter preſs may proceed in the regular order of a little deſcription or demonſtration, the ſmall figures are put upon each drawing; ſo that any number that is wanting on one drawing, muſt be found on the other.

The FIRST FIGURE ſhows the Back Part of the Thigh Bone, which is marked by our ſeeing here, from behind, the length of the neck of the bone;—the manner of its riſing out of the two great proceſſes, the Trochanters;—the projection and roughneſs of the Linea Aſpera, and the deep hollow betwixt the Condyles.

The SECOND FIGURE, or the fore view, is exceedingly ſimple, having no ſtrong marks. The Linea Aſpera is turned almoſt out of ſight. The chief peculiarity of the fore view is, that it ſhows the bending form of the bone.

THE POINTS OF DESCRIPTION ARE,

(1.) The Body :——very thick, ſtrong, of a cylindrical form, bending outwards with a gentle curve.

(2.) The Head, which is very ſmooth, and very fairly circular. It is a large ſegment of a ſmall circle, and is let pretty deep down into its ſocket. There is a dimple at *(a)*, which marks the place where the central ligament once was.

(3.) The Neck of the Bone, long, and almoſt horizontal, to ſet the ſhaft of the bone the wider off from the Haunch Bone, that it may move freely.

(4.) The great Trochanter, a large bump or proceſs for the inſertion of the Glutæi Muſcles.

(5.) The leſſer Trochanter, a ſmaller proceſs, for the inſertion of many muſcles which move the Thigh Bone inwards.

(6.) The Linea Aſpera, or rough line, from which much of the Muſcular fleſh that covers the thigh ariſes.——And this Linea Aſpera, or rough line begins at *(b)* in a forking form from the roots of each Trochanter :——the two lines meet, and the Linea Aſpera becomes ſingle in the middle of the thigh, *(c)*—Towards its lower end *(d)* it forks again to go off towards each Condyle.

(7.) The two Condyles, which form the great articulating ſurfaces of the Thigh Bone, where it lies in the knee-joint.—In Fig. II. we ſee that the inner Condyle *(e)* is the larger one ; being larger to compenſate for the oblique direction of the thigh bone. At *(f)* Fig. II. we ſee, covered with cartilage, the flat poliſhed ſurface upon which the Rotula or knee-pan rolls.—And in Fig. I. at *(g)* we ſee the very deep notch betwixt the two Condyles, in which the crucial ligaments of the knee-joint lie.

FIGURE

FIGURE III.

The Tibia.

THIS is a drawing of the right Tibia, ſeen from before. The upper end belonging to the knee is large and broad, and is likened to the trumpet end of a pipe.—The lower head belonging to the ancle is ſmall, and has one projecting point, *viz.* that which forms the inner ancle, and which is thought to reſemble the flute-mouth of a pipe. The whole Bone has the triangular or priſmatic form of the Ulna and Radius.

(1.) Is the Upper head of the Tibia belonging to the knee joint; where (*h*) marks a little tubercle or riſing, which divides the two articulating ſurfaces from each other. It is from the back part of this tubercle, that the croſs ligaments of the knee joint ariſe. (*i i*) Mark the two lunar hollows, upon which the two Condyles of the thigh bone reſt, and where the ſemilunar or moveable cartilages of the knee joint lie. (*k*) Is that rough circle which bounds the articulating ſurface, and from which the Capſular Ligament ariſes. (*l*) Is the tubercle or bump of the Tibia, upon which we reſt in kneeling, and into which the great fore tendon called the Ligament of the Patella is fixed: and (*m*) is the prominent ridge of the ſhin, which begins from this tubercle, and goes downwards in the waving form of an Italic *ſ*. (*u*) Is that part of the Tibia which receives the upper end of the Fibula.

(2.) Is the middle part of the Bone, which is of a triangular or priſmatic form, and the figure (2) is repeated upon each of the three angles.

(3.) Is the lower and ſmaller head of the Bone belonging to the ancle joint; where (*n*) marks the ſmooth hollow which receives the bones of the foot, and which is named (like the articulating ſurface of the Radius), the Scaphoid, or Boat-like Cavity of the Tibia. (*o*) Marks the projection or proceſs of the inner ancle, which guards the joint, preventing luxation inwards. (*p*) Is the ſmall cavity on the ſide of the Tibia, which receives the lower head of the Fibula, in the way that is repreſented in next plate.

FIGURE IV.

IS a drawing of the Fibula, which is a long ſlender bone, ſo extremely ſimple in its form, that there needs be no further deſcription than this, that the ſhaft of the bone (*q*) is exceedingly ſlender,—— is much longer than the Tibia,—and is triangular like the Tibia. The upper end (*r*) is laid under the projecting head of the Tibia, at (*u* Fig. III.) and it is laid flat upon it; ſo that this articulating and ſmooth ſurface (*r*) is ſmooth only for the ſake of a very ſlight degree of ſhuffling motion.

The lower end (*s*) is the larger.—It unites with the lower end of the Tibia (*p* Fig. III.) to form the ancle joint. This guards the ancle joint without, as the Proceſs of the Tibia guards it within. And this ſmooth articulating ſurface (*t*) is for receiving the ſide of the Aſtragalus, that bone of the foot by which chiefly the ancle joint is formed.

PLATE

J Bell

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PLATE X.

This Plate explains the Text Book, from Page 153, to Page 166.

EXPLAINS the CONNECTIONS of the TIBIA and FIBULA, and all the BONES of the FOOT and of the TOES.

FIGURE I.

SHOWS the TIBIA and FIBULA laid to each other as they lie in the leg; and here all the letters and figures, explaining the Tibia and Fibula of the laſt plate are put upon the very ſame points; ſo that no new letters nor figures are required, except (*v*), to mark that ſpace betwixt the Tibia and Fibula in which the Inter-oſſeous Membrane lies; and (*) to ſhow the arch which is made by (*o*) the proceſs of the inner ancle, and (*s*) the lower head of the Fibula forming the outer ancle: for the deepneſs of the arch, and the projection of theſe two points, ſhow how very ſecure the ancle joint is; the ſmooth head of the Aſtragalus marked (*a* Pl. X. Fig. IV.) being received deep into this arch.

FIGURE

FIGURE II.

SHows the Outer Surface of the Rotula or Patella, which is rough, and marked with many points where its nutritious arteries enter.

FIGURE III.

SHows the Lower Surface of the Patella, viz. that which is turned towards the cavity of the joint; and here there is ſeen a riſing line at (*,) which lies in the great hollow betwixt the two Condyles ;—while the two hollows on each ſide of this riſing move upon the convexities of the Condyles. In ſhort, this ſmooth inner ſurface of the patella is moulded as it were upon the ſurface marked (*f*) in the laſt plate, Figure II.

FIGURE IV. and V.

EXPLAIN all the Bones of the Foot, viz. of the TARSUS or inſtep, of the METATARSUS, and of the TOES.

The bones of the Tarſus are 7 in number, fewer and larger than the bones of the Carpus.

(1.) The Aſtragalus is that great bone which immediately forms the ancle joint ;—where (*a*) marks the great ball or cartilaginous pully which is received into the arch formed by the Tibia and Fibula.—— (*b*) Is the flat ſide of the bone upon which the proceſſes of the inner and outer ancles lie, embracing the joint cloſely.—— (*c*) Is a little flat neck or projection which lies over the heel-bone. (*d*) Is the neck of that large round head which makes a ball and ſocket joint with the Os Naviculare, which is marked (3).

(2.)

(2.) The Os Calcis lies under the Aftragalus, and is the largeft of the Tarfal Bones, fupporting all the weight of the body; and here thefe points chiefly are feen.—(*e*) The tip of the bone, which looks upwards, receiving the Tendo Achillis, or great Back Tendon. —— (*f*) The loweft rough point; the point of the heel upon which we ftand.—— (*g*) The head, by which the Os Calcis is joined to the Os Cuboides, marked (7.) the Os Cuboides being received at this part into a large hollow focket of the Os Calcis.

(3.) Is the Os Naviculare or Scaphoides, whichhas been fo named from its refemblance to a boat. But if there be any fuch refemblance it is effectually concealed in all thefe views. The Os Naviculare has rifing edges and a fair round focket, which is turned towards the Aftragulus (1.) to receive the large round head of that bone.

(4, 5, and 6.) Are the Cuneiform or Wedge-like Bones; and in this view the fquare external furfaces chiefly are feen;—and thefe Cuneiform Bones, ought juft to be reckoned fimply according to their order, the firft, fecond, and third cuneiform bones, beginning with that which fupports the great toe.

(7.) The Os Cuboides is a large fquare or cube like bone, as its name implies, but by no means a regular cube.——It forms a large fhare of the Tarfus, and fupports the Metatarfal Bone of the Little Toe.

The Cuneiform Bones are lefs eafily underftood, and I have therefore made a fecond drawing of the foot, Fig. V. (where the fame letters and marks are ftill preferved,) in which I have fhown the point of the Cuneiform Bones, the Metatarfal ones being taken away. In this figure the faces of the Cuboid and of the Cuneiform Bones are directly feen. And it is underftood why they are called Cuneiform or wedge-like bones, for the upper furfaces marked (4, 5, 6,) are broad and fquare; —— while their lower furfaces at (*) are fmall and pointed; Thefe fmaller ends of the wedges being turned inwards or towards the foal of the foot. In Fig. IV. (*h*) marks the five Metatarfal Bones; fo named from their being placed on the

the Tarſus.—(*i*) Marks the firſt rank or phalanx,—(*k*) the ſecond,—(*l*) the third rank of the bones of the toes.

FIGURE VI.

SHows the foot in profile, and explains particularly well the large head of the Aſtragalus (*d*). Theſe drawings are juſt half the ſize of nature, whence it may eaſily be underſtood how large this head of the aſtragalus is;—as large fully as the head of the ſhoulder bone:—and the ſocket of the Os Naviculare, (3), into which this head of the aſtragalus is received, is both larger and a deeper circle than the Glenoid Cavity of the Scapula, into which the head of the ſhoulder bone is received.

The manner in which the proceſs (*c*) of the Aſtragalus is joined with the Os Calcis, (2) ſo as to allow of a ſhuffling motion, is alſo explained here. The great length of the firſt bone, or Metatarſal Bone of the great toe (*b*) is alſo to be obſerved, becauſe it is ſometimes to be cut away; and it ſhould not be forgotten that it goes very deep into the foot.

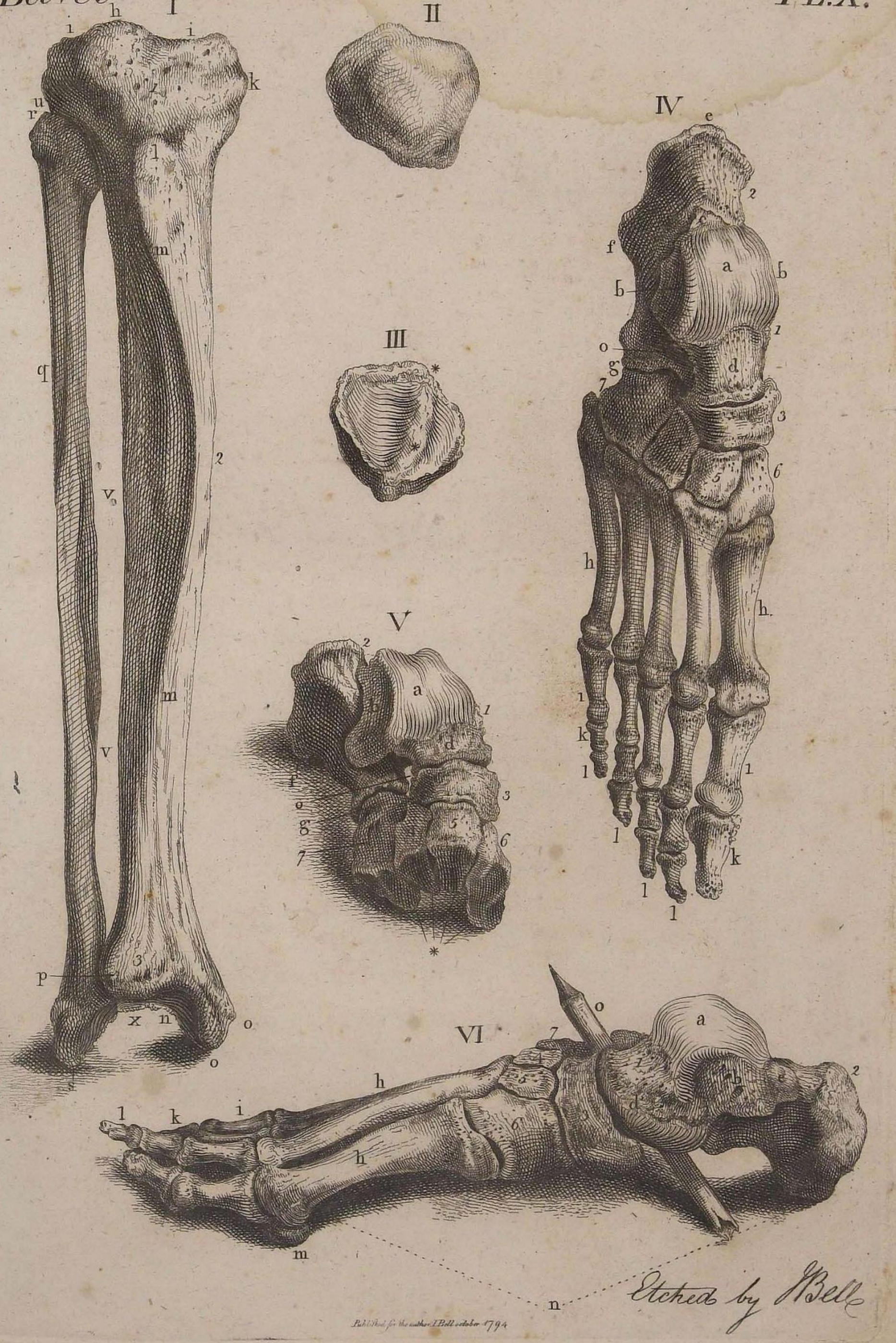
The ſmall bone, commonly called Seſamoid Bone, from its reſembling, or being thought to reſemble, a grain of Seſamum (though it is much larger), is ſeen here at (*m*) lying under the ball of the great toe, where it is connected with the tendons of the ſhort flexor muſcles of the great toe.——There are commonly two under the ball of each great toe, and there are occaſional Seſamoid bones under the other toes, and ſometimes under the great joint of the thumb.

The ſeveral Phalanges, as they are called, or ranks of bones in the toes, need not again be explained.

The only important point remaining to be explained, is the double arch of the foot; for there are two arches. Firſt (*n*) the great and general arch;——the two points of which are the tip of the heel, and the ball of the great toe. Theſe points alone of all the foot touch the ground.—The elaſticity of this arch, proceeding from its numerous bones and their joinings, gives a ſpring and eaſe in the ſtep; and the arch is

is ſupported under the weight of the whole body, both by the particular ligaments belonging to the individual joints of the foot,—and more particularly by the Great Faſcia or ligament, (I would call it,) of the ſole of the foot, which from one point (the heel) extends to the root of each toe individually.

But there is alſo a ſecond and particular arch, which the bones of the Tarſus form among themſelves. This arch is explained by ſhowing a large central hole, which is expreſſed in each of theſe drawings, and is marked (*o*).—In Fig. IV. there is only a darkneſs ſhowing where this central hole is.—In Fig. V. the hole is ſeen fair (by the Tarſus being turned round, and is marked (*o*). In Fig. VI. it is explained by a broken pencil, (*o*) thruſt up through this central opening.



Etched by J Bell

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PLATE XI.

This Plate explains the Text-Book, from Page 166, to Page 177.

OF the SCAPULA, CLAVICLE, and ARM BONE.

FIGURES I. AND II.

EXPLAIN the Scapula, ſhowing, *1ſt*, its internal,—*2dly*, its external ſurface.

The Scapula or Shoulder Blade, is of a triangular ſhape. (*a*) Marks its flat ſurface, which is turned towards the ribs, hollow, to ſuit the convexity of the ribs.——And the letter (*a*) is repeated all over the ſurface, to ſhow the little riſings of this ſurface; for this is the part upon which the Sub-ſcapular Muſcle lies; and theſe riſings are the marks of its fibres.

(*b*) Shows the Outer Surface of the Scapula, which is in its turn a little convex;—is croſſed by the Spine, or that high ridge (8) which divides it into two ſurfaces;—the lower ſurface (*c*) holding the infra-ſpinatus;—the upper ſurface (*d*) holding the ſupra-ſpinatus muſcle.

THE LINES AND PROCESS OF THE SCAPULA ARE THESE;

(1.) Is the upper Coſta or border of the Scapula, where (*e*) marks a notch, which is ſometimes a complete hole, or when incomplete it is made out by a ligament. It gives paſſage to the Scapular arteries and nerves.

 (2.) The

(2.) Is the Lower Cofta or border, which is round, and at the place (*f*) gives origin to the Teres Major and Teres Minor mufcles.

(3.) This long fide is called the Bafis of the Scapula, and has the great Trapezoid and Rhomboid Mufcles implanted into it from above and behind; while the Serratus Anticus is implanted into it from before and from below.

(4.) Shows the Upper Angle which receives the Levator Scapulæ Mufcle.

(5.) The Lower Angle.

(6.) The Glenoid or Articulating Cavity, which is particularly fmall and fuperficial, confidering how large the head of the fhoulder bone is.

(7.) The Neck of the Scapula fo called; it is the fmaller part which fupports the head, though, properly fpeaking, there is no neck;—and when the head of the fhoulder bone is faid, in a luxation, to lie upon the neck of the Scapula, it lies upon the place marked (*g*).

(8.) The Spine of the Scapula, which divides the upper furface, and which, rifing higher as it goes forwards, terminates at laft in the Acromion Procefs.

(9.) Is the Acromion Procefs; it is juft the end of the fpine, which turns its flat fide towards the head of the fhoulder bone, and overhangs the fhoulder to defend the joint, and prevent luxations upwards.

(10.) And there is ftill a farther fecurity; for the Coracoid Procefs (10) ftands upon the inner fide of the joint, and defends it within. It is named Coracoid Procefs, from its being crooked like the beak of a crow.

FIGURE III.

EXPLAINS the Clavicle or Collar Bone: a bone which is extremely fimple in its form, and has few or no parts;—and in which the letter (*h*) marks the middle, the roundeft part of the bone, that point which is moft prominent in the breaft; the part moft frequently broken. (*i*) Marks the end neareft the Thorax, and fhows the

the circular articulating ſurface, by which it is joined to the Sternum; and under this end a ſmall moveable cartilage lies. (*k*) Marks the outer end, or that which is turned towards the ſhoulder blade: the Clavicle is flattened at this end, and touches the Acromion by one ſingle point only.

FIGURE IV.

THE Os Humeri, Shoulder Bone, or Arm Bone.

(1.) The head is large,—flat,—is a ſmall ſegment of a large circle,—ſeems quite diſproportioned to its ſocket, (6. Fig. I. II.)

(2.) Is the neck as it is called; though there is no proper neck; there being no length, nor narrower part betwixt the body and the head of the bone.

(3.) The Greater Tuberoſity.

(4.) The Leſſer Tuberoſity;—the Greater and Leſſer Tuberoſities being two knobs, for the inſertion of thoſe muſcles which come from the Scapula.

(5.) Is the Groove betwixt theſe tuberoſities, for the paſſage of the long tendon of the Biceps Muſcle, which runs here as a rope does in its pulley.

(*a*) Marks the roughneſs about one third down the arm bone, into which the tendon of the Deltoides is implanted.

(*b*) Marks the place, where (a little below its middle) the Os Humeri turns flatter, becauſe it is to terminate flat and broad, to favour the hinge-like joining of the bones of the fore arm; and

(6.) Shows one ridge on the inner ſide of the arm bone;

(7.) Shows another ſimilar ridge or edge of the bone, on its ~~inner~~ outer ſide—each ridge running down towards its own Condyle.

(8.) Is the external Condyle, ſmaller and leſs projecting, becauſe it gives origin only to the extenſors of the hand and fingers, a ſet of muſcles which do not need much power nor the advantage of a long lever.

(9.) Is

(9.) Is the inner Condyle, which is very long and very prominent, to give a greater power to thofe mufcles which bend the hand and fingers.

The elbow joint, being a very ftrict and limited hinge, has a long articulating furface :— and there are properly two furfaces, one for the Radius, and one for the Ulna.

(10.) Is the longer articulating furface, to which the Ulna is fo joined as to perform none but hinge-like motions.

(11.) Is a neat fmall round knob, tipped with fmooth articular cartilage; and to this fmall knob, the face of the button-like end of the radius is applied; and by the roundnefs of this knob the radius is enabled to perform not only the hinge-like motions to accompany the motion of the Radius; but alfo its own free circular motions, by which the hand is carried round.

(12.) Is that very deep hole which the Coronoid Procefs of the ulna checks into.

(13.) There is a fimilar one marked (13,) which belongs to the demonftration of the fore part of the fhoulder-bone, and is to be feen by turning to the next plate.

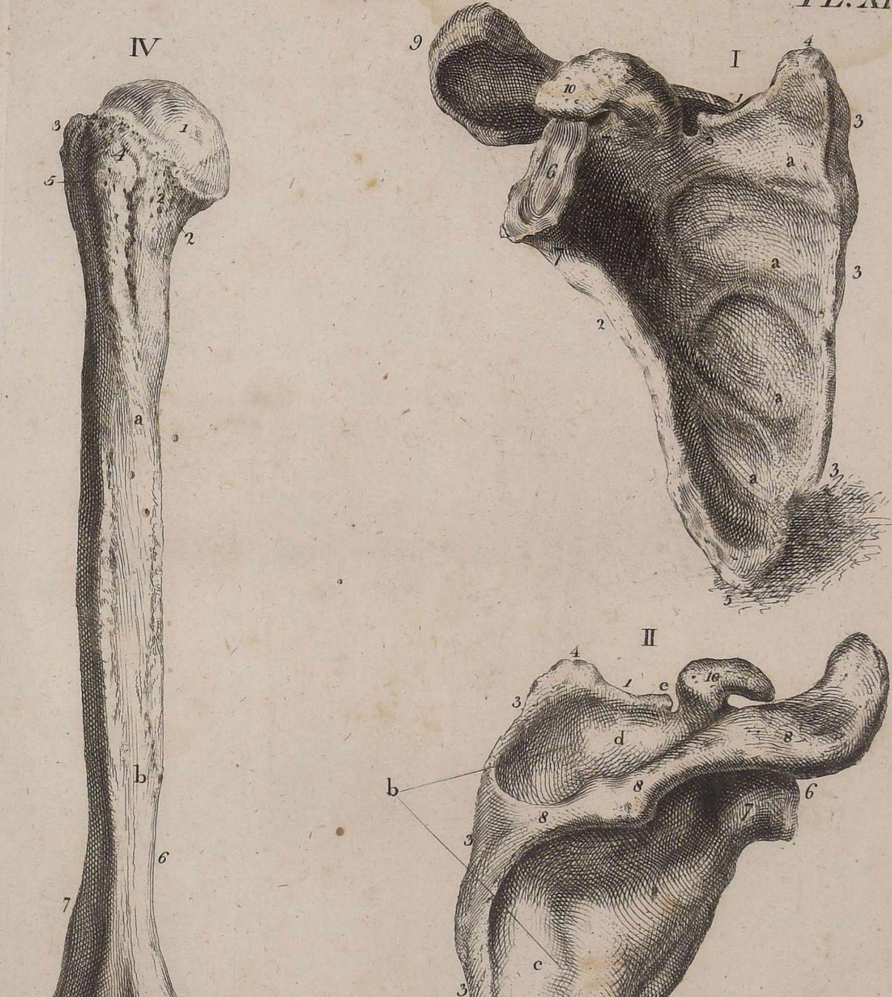

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PLATE XII.

This Plate explains the Text Book, from Page 177, to Page 190.

EXPLAINS the RADIUS and ULNA, CARPUS and FINGERS.

FIGURE I.

IN the drawing of the Os Humeri, all the defcriptions and letters belonging to the laft plate belong equally to this. This drawing were fuperfluous, but for the important purpofe of fhowing the back part of the articulating furface, where we do not find that round furface marked (11) in the laft plate, and which is called the Leffer Head of the Humerus, but only the hinge-like furface for the articulation of the Ulna. And the chief object of this drawing, is to fhow, that here alfo upon the back part of the bone, there is a deep hollow betwixt the Condyles ; on the fore part of the bone the hollow is for receiving the Coronoid Procefs of the Ulna, which checks into that hollow when the arm is bent forwards; but here upon the back part, this deep hollow, marked (13,) receives the Olecranon, or great procefs of the Ulna, when the arm is extended. It is alfo to be obferved; that in this drawing the twifted form of the bone is well expreffed and truely, not caricatured; for the edge does in fact turn thus round.

FIGURE II.

The Ulna.

THE Ulna is the longer of the two bones which lie in the fore arm. The whole bone is of a triangular ſhape, with 3 ſharp edges; the upper end is larger, and belongs to the elbow joint; the lower or Little Head belongs to the wriſt. The bone has theſe points of deſcription.

(1.) Is the great cavity, which receives the lower end of the ~~radius~~ Humerus to form the elbow joint, and this is called the Greater Sigmoid cavity.

(2.) The Olecranon, a large tubercle which marks the point of the elbow upon which we reſt, and guards the Sigmoid Cavity behind.

(3.) The Coronary Proceſs which ſtands up, and guards the Sigmoid Cavity before.

(4.) The Hollow, where the ſide of the ſmaller button-like head of the Radius rolls, called the Leſſer Sigmoid Cavity.

(5.) The Prominent Roughneſs, into which the tendon of the Brachialis Internus is implanted; and it leads to the ſharp ridge.

(6.) The Sharp Ridge, from which the Inter-oſſeous Membrane goes off.

(7.) The Lower Head of the Ulna, which is ſmall, and button-like; for it is received into a hollow on the ſide of the Radius, and it is upon this point, viz. the little head of the Ulna, that the radius turns in the continual motions of the hand.

(8.) Is the Styloid Proceſs of the Ulna, which is pointed, as the name implies; from it ligaments go off to ſtrengthen the joint of the wriſt.

FIGURE III.

EXPLAINS the relative poſition of the Radius and Ulna. The Ulna is marked with figures according with the above deſcription; the Radius is alſo marked with its points of demonſtration.

1. (*a. a. a.*)

1. (*a. a. a.*) Repeated on the three ſides of the Radius, explain the general triangular form of the bone, marking particularly its three edges.

2. (*b*) Marks the upper head of the Radius, flat, round and button-like, with the ſide rolling upon the Leſſer Sygmoid Hollow of the Ulna.

3. (*c*) The neck of the Radius or ſtraiter part, which immediately ſupports the head.

4. (*d*) The Bump or Tubercle of the Radius, into which the tendon of the Biceps Muſcle is implanted.

5. (*e*) The Lower Head of the Radius; the Bone is thus gradually enlarging towards its lower end.

6. (*f*) The Scaphoid, or boat-like Cavity on the lower end of the Radius for receiving the two largeſt bones of the Carpus ;—forming the wriſt joint.

7. (*g*) The Styloid Proceſs of the Radius, which bounds the wriſt joint towards the ſide of the thumb: and here it is ſeen how the little head of the Ulna (7) is received into the hollow ſocket on the ſide of the Radius.—The two ſharp edges of the Radius and Ulna are oppoſed to each other, ſhowing how the Inter-oſſeous Membrane ſtretches from the one bone to the other, filling up all the ſpace marked (*h*.) And it is here ſeen that the Radius is ſomewhat arched towards the Ulna, ſo as to roll round it without touching it, or hurting or diſordering the numerous muſcles, &c. which lie upon the Inter-oſſeous Membrane.

FIGURE IV.

EXPLAINS the Bones of the CARPUS or WRIST, as they are ſeen from the outſide, or back of the hand.

The Bones of the Carpus are 8 in number, they are divided pretty regularly into two rows ;—and we rather chooſe to count and demonſtrate them according to their rank, than as individual and ſeparate bones : for as ſeparate bones there is nothing very particular in any one ; but by their combination and form, and as they relate to the

wrist joint, or to the fingers, it surely must be important, I should rather say, necessary, for the surgeon to remember them.

FIRST ROW.

Forming the Wrist Joint.

(1.) The Scaphoid Bone, where the figure (1.) marks the regular round surface, which forms a chief part of the ball and socket-joint of the wrist. And (*a*) marks the great hook-like projection of this bone, whence that strong ligament which braces down the tendons of the Carpus arises.

(2.) The Lunated Bone, where the figure is so placed as to mark the large ball-like surface of this bone which joins with the Os Scaphoides to form the ball of the wrist. —— And the lunated part of the bone is concealed, when thus joined with the others.

(3.) The Cunieform Bone, of which only the broad or square surface is seen on the back of the wrist, while the narrower part of the wedge is in the palm.

(4.) The Pisiform Bone, so named from its roundness, this bone is a little removed from the direction of the row to which it belongs.

SECOND ROW.

Receiving the Metacarpal Bones.

(5.) The Os Trapezium; or first bone of the upper row named Trapezium, from its square and angular form. It has the ball of the thumb planted upon it, and the figure points directly to that socket which receives the thumb.

(6.)

(6.) The Trapezoides, so named from its resemblance to the last.

(7.) Os Magnum, for it is the greatest; and it has a curious head which is in this view concealed under the Os Lunare; for the head of the Os Magnum is received into the semicircular hollow of the Os Lunare, forming a ball and socket joint with that bone.

(8.) The Os Unciforme, or hook-like bone; the hook of which is towards the palm, and therefore not seen in this view.

N. B. In this drawing of the Carpus, Fig. IV. this group of bones is made to rest chiefly upon two of the corner bones, viz. the hook of the Os Scaphoides, and the Os Pisiforme.

FIGURE V.

Is also drawn chiefly with the intention of explaining the carpus; and here the same numbers may serve, for the position of the Carpus is very little changed.

(1.) is the Scaphoid Bone; (2.) The Lunar Bone, forming with the Scaphoid the ball for the wrist joint. (3.) The Os Cuneiforme. (4.) The Os Pisiforme is out of sight. (5.) The Trapezium which supports the thumb; (6.) (7.) (8.) The Trapezoides, Magnum, and Unciforme, supporting all the others fingers; and here the Os Magnum (7.) is seen a little fuller; so that the round head of it can almost be seen jointed with the Os Lunare. The *1st*, *2d*, and *3d* Phallanges or rows of bones belonging to the several joints of the fingers, need not be explained; and the round heads for the joints of these finger bones explain themselves.

FIGURE VI.

Presents the Carpus in a new direction; showing those bones which are less perfectly seen in the other drawings;—and it is necessary to observe, that the group of the

Carpal bones is now turned, ſo as to ſhow that face of them which receives the Metacarpal Bones;—and the group now reſts chiefly upon the points of the two upper Corner Bones, *viz.* the Trapezoid and Unciform Bones; as in the other view it reſted upon the lower Corner Bones, *viz.* the Scaphoid and Piſiform Bones. So that here there is only the upper row fairly demonſtrated, *viz.*—(5.) The Os Trapezium;—(6.) the Os Trapezoides;—(7.) the Os Magnum;—(8.) the Os Unciforme. (*b*) Marks a ſmall pointed projection of the Os Trapezium, whence the Carpal Ligament ariſes.—(*c*) Marks the great Unciform or hook-like proceſs of the Unciform Bone, which is another point whence the ſame croſs ligament of the Carpus riſes.—(*d*) Marks the arch which the Carpal Bones make, and the Tendons of the wriſt lie in this arch, and are bound down by the croſs ligament croſſing from the one corner point, to the other.

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Etched by J.Bell

THE

SECOND BOOK.

OF THE

MUSCLES.

BOOK SECOND.

OF THE

MUSCLES.

PLATE I.

MUSCLES OF THE FACE.

This Plate explains the Text Book, from page 191, *to page* 213.

THIS Plate explains the chief Muſcles of the Face; and there are ſeen here ſeveral Muſcles alſo of the Neck, Throat, Shoulder, and Breaſt.—It was drawn from a ſubject that had been hanged, and the neck being broken, the head lies flatter upon one ſhoulder, than it ſhould do even in the dead body; for the Atlas and Dentatus, the two firſt Vertebræ of the Neck, were fairly broken looſe from each other.—The Muſcles are more diſtinctly ſeen on the left ſide; on the right ſide they are thrown into ſhadow, and are but faintly indicated.—The muſcles of the outline are truer in point of Anatomy; while, in the full engraving, the general

general appearance, the thinneſs and delicacy, and the undefined connections of the muſcles, are well expreſſed; and it is to be particularly noticed, that the Levator Anguli Oris (7.) is not ſo true in the engraving, while it is, I believe, very true and correct in the outline.

(1.) Is the Occipito Frontalis, which covers the Occiput and forehead, with its two fleſhy bellies, and the crown or top of the head with its thin flat tendon. The Occipital Belly is not ſeen here. The thin Tendon ſometimes miſtaken for the Pericranium, is marked (*a*); the Frontal Belly is marked (*b*); or rather there are two Frontal Bellies marked (*b b*). Each Frontal Belly ſends a ſmall ſlip of fibres, or a peak, down upon the back of the Noſe marked (*c*) *. The Frontalis is connected chiefly with the ſkin, but little with the bone; is chiefly for furling up and wrinkling the ſkin of the forehead.

(2.) Is the Corrugator Supercilii, more connected with the Orbicularis Oculi, than with the Occipito Frontalis, and lying under the Occipito Frontalis.

(3.) Is the Orbicularis Oculi; ariſing by a ſmall white Tendon (*d*), from the Naſal Proceſs of the Jaw Bone. Its fibres go in regular circles round the eye, and they are continued circles which return to the white Tendon in the corner of the eye, whence they firſt ariſe; the whole muſcle is thin, flat, broad, very diſtinct, ſhuts the eye-lids, compreſſes the eye, ſqueezes out the tears †.

The

* This Naſal Peak of the Occipito Frontalis is not the ſlip which is fixed into the Os Frontis; that lies deeper, while this Naſal Peak is ſuperficial, runs down the back of the Noſe, expanding upon it, and forming with the muſcles below a ſort of faſcia, or Tendinous expanſion, which covers the Noſe This Naſal ſlip is implanted rather into the ſkin of the Noſe, and wrinkles it; while the General Muſcle corrugates the ſkin of the forehead.

† The whole of what we call the Orbicularis Oculi, is named by Walther, Corrugator Oculi; and he ſeems to divide it into an upper and lower portion, by the names of Muſculus Semicircularis Palpebræ Superioris, and Muſculus Semicircularis Palpebræ Inferioris.

The CORRUGATOR SUPERCILII (2.) arifes from the Os Frontis betwixt the Eye-brows, and lies under that Peak of the FRONTALIS which expands upon the back of the Nofe.—This Corrugator may almoft be confidered as merely a flip of the Orbicularis Oculi (3.); for in fact the fibres of the Corrugator go round the orbit with the upper fibres of the Orbicularis Oculi, and mix with them, fo as to form the upper edge of the Orbicularis; and thence the names of Corrugator and Orbicularis are fometimes interchanged *.

(5.) † Is the LEVATOR LABII SUPERIORIS, and ALÆ NASI; This mufcle arifes by a fmall double Tendon, from the Nafal Procefs of the Upper Jaw Bone, and has one little flip (*e*) going into the Ala Nafi for dilating it; and another (*f*) going into the upper lip, for drawing it upwards ‡.

(6.) LEVATOR LABII SUPERIORIS PROPRIUS, arifes from the Jaw Bone at the very edge of the Orbit, and above the Infra Orbitary Hole §. It has two flips of fibres, one (*g*) coming from the bone, from under the Orbicularis Mufcle, and another flip, (*h*) which is continued from the lower fibres of the Orbicularis Mufcle itfelf. So this is a Biceps Mufcle; it lies fuperficially; it draws the middle of the lip upwards; it is often named as a Biceps or two headed Mufcle ||.

* Walther, in his defcription of his own and Sanctorin's Plates, draws into the explanation of this Corrugator Mufcle, all the upper part of the Orbicularis Oculi; as if it were but a part of the Corrugator.

† It will be obferved here, that the fuite of the numbers 1, 2, 3, &c. is not regularly followed, becaufe it was impoffible to explain abfolutely every mufcle in any fett of drawings, however full.

‡ "Maxime hunc in ufum habent illi, qui detractores contemptorefque funt aliorum, et forte hæc "verba in uno vel altero eundum motum excitabunt."

§ This is the MUSCULUS PYRAMIDALIS of Walther.

|| Euftachius draws the mufcle with thefe two heads. Albinus defcribes the little head (*h*), as a diftinct part of the mufcle, both in his explanation of Euftachius, and in his own plates. Cant obferves

(7.) Levator Anguli Oris; arifes above the dog tooth, and is thence named Caninus.—This mufcle arifes under the Infra Orbitary Hole, as the laft arofe from above it; this of courfe lies under the laft, and fo is lefs perfectly feen here. Its direction is different from that of the Levator Labii; as it runs more perpendicularly, or runs rather outwards than inwards. It is fhort; two headed like the laft; rifes properly from the Socket Procefs of the firft Grinder. It lifts the Angle of the mouth, whence its name; and it operates on both lips, whence it is named, Levator Communis.

(8.) Zygomaticus Major; arifes from the Zygomatic Procefs of the Cheek Bone; goes inwards to the corner of the mouth; is long, flender, oblique in its direction. It paffes over that hollow in the Cheek Bone, which is filled up with fat, and fo when the mufcle is diffected, it falls into this loofe flaccid and bending form *.

(9.) The Zygomaticus Minor, like it, but not always found.

(10.) The Buccinator, is feen here to lie deeper; it forms the flat part of the cheek; it arifes from the Coronoid Procefs of the Lower Jaw, and from the roots of the back Grinders. It goes forward with direct fibres, (as feen here) towards the corner of the mouth.

(11.) The Triangularis, is neat, fmall, triangular; its bafe arifes from the Jaw, its point ends in the corner of the mouth.—It draws the corner of the mouth down, and is named Depreffor Anguli Oris, or the Depreffor Communis Labiorum.

(12.) Is the Depressor Labii Inferioris Proprius. This mufcle arifes from the line of the Jaw, touches and croffes its fellow under the middle of the lower lip. They pull the lip downwards.

(13.) The Orbicularis Oris, is thick, broad, and flefhy; forms the flefhy part of the lip;

ferves this feparate part proceeding from the fibres of the Orbicularis, fo particularly as to reckon it almoft a diftinct mufcle, a depreffor of the lower Eye-lid; faying, "Ex confpectu illum habere decet "pro depreffore Mufculo Palpebræ Inferioris." *Cantii Impetus.*

* This Zygomaticus Major, is fometimes fplit into two infertions at the angle of the mouth.

lip; is in the red part of the lip, but is much broader than the red part. Its fibres are grofs and ftrong, they go in a circular direction fairly round both lips, they are not interrupted at the angles of the mouth; they fend up a fmall flip, which paffing in the furrow of the lip, and mounting upon the Septum of the Nofe, is named Nafalis, and is marked (*i*).

(15.) The CONSTRICTOR NASI, is here diftinctly marked running over the point of the Nofe *.

(30.) Is the TEMPORAL MUSCLE; which is feen here, lying under its fafcia. The fafcia, or Tendinous expanfion of the Temple being here entire, and nothing cut away but the Membraneous Mufcles of the ear, the ANTERIOR and the SUPERIOR AURIS.

(31.) Is the MASSETER, which is a fhort, thick, and flefhy mufcle; and to lay it entirely open, the Parotid Gland which is marked (*k*), is diffected up from the cheek, fo that the head of the Mafleter is feen arifing from the Cheek Bone; and its lower end is feen implanted into the Jaw †.

(*m*) Marks the FASCIAL ARTERY, or LABIAL ARTERY, as it is called, the Artery of the face, croffing over the angle of the Jaw.

Thus we fee in the dead body, thofe mufcles which give form and character to the human countenance, lying all dead and flaccid. The mouth open, the lips loofe and fhrivelled; the angles of the mouth dropping down, the cheek funk; and the eye alfo clofed, and funk down within its orbit.—All the countenance is deformed, and the traits of individual character or beauty, quite gone:—but ftill enough remains to explain to us what thofe mufcles are, upon which chiefly the interefting variety of expreffion and form depends. The Occipito Frontalis wrinkles the

 forehead.

* This is the Tranfverfus Nafi of Walther. The action of this mufcle is very diftinctly feen, in the agony of an Afthmatic fit; it is feen alfo in violent diftortion, produced by rage, or defpair. Cant compares it to that mufcle in the dog, by which he curls the Nofe, and fhows the teeth in fnarling.

† This is fometimes called, the MUSCULUS MANSOR.

forehead: the Corrugator Supercilii knits the brows: the Levatores Labiorum lift up the lip, ſpread wide the noſtrils, and open the mouth; the Depreſſores Labiorum depreſs the lip; the Triangular Muſcles draw down the corners of the mouth; the Zygomatic Muſcle diſtorts the cheek, and the Orbicularis Oris antagoniſes all theſe, and cloſes the mouth.—Theſe muſcles, while they are performing more important offices, alſo expreſs the paſſions, and mark the countenance with traits never to be effaced, the true ſtudy of thoſe who would be Phyſiognomiſts; who talk but idly, when they ſpeak of expreſſion in thoſe immoveable features, which are formed rather by the Contour of a bone. "The ſagacious forehead or œconomical "noſe," are the rhapſodies of an Enthuſiaſt, not the ſerious obſervations of a ſedate man, ſtudious of that ſubject, which is intereſting above all others.

The ſhapes of the bones determine the general form of the face. One great muſcle, the Maſſeter, gives the rounding of the cheek; the reſt are all delicate and moveable muſcles; and the great characters of the face, center round the mouth and noſtrils where theſe muſcles converge. The lean and delicate face, gains in expreſſion where the cheek is hollow, the angle of the mouth moveable, the lines ſtrong; but in thoſe who are bloated, the cheek is fuller, the lines obliterated, the delicate turnings of thought and feeling are loſt; all but the more violent ſtrains of paſſion are buried in the maſs. The great lines of character, are the line of the Zygomatic Muſcle, coming from above, and of the Triangular Muſcle coming from the chin; and the moving point towards which they all act, is the corner of the mouth. In chearful emotions the features riſe all towards the eye, which becomes full and turgid. In the depreſſing paſſions the features ſink, the eye is languid, and the whole countenance gets a thoughtful ſerious caſt. But ſtill it is the corner of the mouth, that is the central point of all theſe changes.

The corners of the mouth are continually ſupported by the action of the Levator, and of the Zygomatic Muſcles; they are raiſed high in ſmiling, ſo as to form a dimple there. They are raiſed higher in laughter, ſo as to ſwell the cheek, wrinkle the

 eye

eye-lids, and comprefs the eye, till tears begin to flow. And the corner of the mouth, which is thus raifed in laughter, is diftorted in pride, malice, hatred; is dilated and drawn backwards in rage; drops lower in grief; and in palfy falls quite down.

Thefe movements round the angle of the mouth, are the chief indications in the face itfelf, while all other indications of paffion, proceed rather from the general fyftem. A healthy body, and chearful mind, have the face full, the eye humid, the limbs braced, the whole body free, and light moving. In languid health, or under affliction and care, the face is pale, the eye cold, the whole body languid and relaxed; and fo it is in paffion, for the medical arrangement of the paffions is nearly correct. There are two great claffes of paffions, the exciting and the depreffing paffions; in the exciting paffions, as joy or anger, the heart beats high; the face is turgid; the eye prominent and fparkling; the mufcles are tenfe; the limbs braced; the whole body is in a moveable, active, and highly excited ftate. But when the heart beats languid in grief, or palpitates with fear, the face becomes pale, the features fink, the limbs tremble, the whole frame is unbraced, cold, and unapt for motion; and from thefe general conditions of the fyftem refult all thofe other marks of paffion, which accompany the changes of the face; for in grief, fear, defpair, the blood ebbs, and the face is pale, and the features fink; while in anger the face is red, the eye brows corrugated, and the eye turgid and ftrained; but in rage, the whole mufcular frame is ftrained toward the moft violent action, the breath is retained, while the pulfe beats high; and fo the face becomes turgid, the eye is fiery and red, there is a grinding of the teeth, the angles of the mouth are ftrained backwards, the noftrils are raifed and dilated, the Buccinator, Zygomatic, Mafleter, and Temporal Mufcles are in violent action, which gives an Angular and Linear hardnefs to all the features; and faliva and foam proceed from the univerfal preffure upon all the glands.

MUSCLES

MUSCLES OF THE EYE.

FIGURES XII. AND XIII. of Plate II. Explain the Mufcles of the Eye.

The origin of the Mufcles at the bottom of the Orbit, being once underftood, all their mechanifm will be very plain and eafy, for this fingle point has been the chief difficulty from the firft. Galen counted the Levator Palpebræ, as one of the proper mufcles of the eye; Vefalius underftood better than Galen the origin of the Recti Mufculus from the bottom of the Orbit, but like Galen he has drawn the eye from Brutes, and has defcribed its mufcles, and drawn them in fo confufed a way, that it is not eafy to comprehend that mufcle of his, " which adheres in all its " courfe to the Optic Nerve. (Septimus Oculi Mufculus, nulla ex parte a viforio " nervo liberatus.") But even after this difcovery of the true origin of thefe mufcles, one author of very high reputation, Mr Lieutaud, denied the origin of thefe mufcles around the root of the Optic Nerve; believing that the fixed point, or center of all thefe mufcles, was a point a little to the outer fide of that hole, by which the Optic Nerve enters the focket.

But now this point, of their general origin from the bottom of the focket, is univerfally acknowledged; and the chief difpute is, whether thefe five mufcles, in arifing round the root of the Optic Nerve, begin from the periofteum of the focket; or from the bone itfelf, or from the outer coat (the Dura Mater) of the Optic Nerve; or whether they do not arife by a particular ring, which furrounds the root of the Optic Nerve; for Valfava believed that thefe mufcles began by a fort of ring, which as it furrounded the root of the Optic Nerve, he chofe to call Circulus Moderatorius Nervi Optici. But in this difpute, as ufually happens, both parties are right, and both are in fome degree wrong; for two of the five mufcles arife more properly from the outer coat of the Optic Nerve, while the three others arife plainly from the

the Dura Mater where it forms the perioſteum of the Orbit; the Dura Mater gradually aſſuming the nature of a common tendon, from which thoſe three muſcles ariſe.

The place where this tendon begins, is the inner end of that Foramen Lacerum which belongs to the Sphœnoid Bone, and which admits the ſmaller nerves to enter for the muſcles of the eye; for when the Dura Mater has come out by this hole from the Cranium into the Orbit, it aſſumes, juſt where it covers that hole, a hard and tendinous nature, becomes white, aſſumes the appearance of a tendon, and is in fact, the common Tendon by which three of the muſcles ariſe; and as this hole is below the Optic Nerve, and toward the outer ſide of it, the muſcles which ariſe by this common tendon are chiefly thoſe which pull the eye outwards or downwards; and ſo this common tendon gives origin to the Abductor, Deprimens and Adductor.

But thoſe muſcles again which cover the upper part of the Optic Nerve, ariſe cloſe round the margin of the Optic hole; they touch the nerve and adhere to it; by adhering to the nerve, they may be ſaid to ariſe from the nerve or from that Angle of the Dura Mater where it comes through the Optic hole, to go over the Optic Nerve. So the Levator and the Obliquus Superior ariſe from the Dura Mater, where it forms the ſheath of the Optic Nerve; while the Deprimens, Abductor, and Adductor, ariſe by one common tendon from the Dura Mater where it covers the Foramen Lacerum, forming the perioſteum of the orbit.

This is all ſeen at (*a*), Figures XII. and XIII. where (*a*) ſhows the fringed edge of the Dura Mater ſurrounding the root of the Optic Nerve; (*b*) the origins of the Levator and Obliquus Superior, in the angle where the Dura Mater turns backwards. And (*c*) ſhows the origin of the Abductor and Deprimens coming from the Perioſteum of the Foramen Lacerum, a little to one ſide of the great Nerve.

The only other difficult point, and which is more important ſtill, ſince it explains the relative ſize, and ſhape, and courſe of theſe muſcles, is the true place of this central

central point from which the mufcles rife, or in other words, the true place of the Optic hole by which the Optic Nerve enters, and from the margins of which all thefe mufcles rife. This will be eafily explained by the marginal plate, which fhows the holes within the focket; the pofition of the eye with regard to thofe holes, and fo explains the relative length of each of the mufcles.

1ft, The eye is placed in the focket, as I have reprefented by the circle (*a*), not directly in the middle, but a little to one fide. The eye does not look out from the Orbit in the direction of the Axis of the Orbit; for the axes of the two orbits meet almoft in the bottom of the focket, croffing in the Cella Turcica, * but both the eyes look directly forwards. The plane of the fore part of the Orbit being oblique, and falling off towards the temple, while the eye looks directly forwards; the axis of the Orbit, and of the eye can not coincide †. This is the reafon of the Pupil, being nearer to one angle and not in the center of the focket, for which we have the beft authority, that of meafuring the eye when we pleafe. But the authorities of books on this point are thefe; Heifter makes the Pupils diftant three inches from each other. Camper makes the Pupils diftant two inches and a half. But the eye being compared not with the other eye, but with its own focket, it is found that the center of the Pupil is eight lines from the outer angle of the eye, and feven lines from its inner angle ‡. Thefe are my rules for placing the eye in its focket, in this plan. And the eye being thus regularly placed, we find by this drawing, (not geometrically true, but ftill fufficient for proving and illuftrating fo plain a matter as this is,) that the Foramen Opticum and the larger end of the Foramen Lacerum are much above the center of the orbit, and towards the inner fide; whence it is plain that the Optic Nerve in going towards the ball of the eye, moves a little outwards and defcends. And it is alfo very

* Camper.

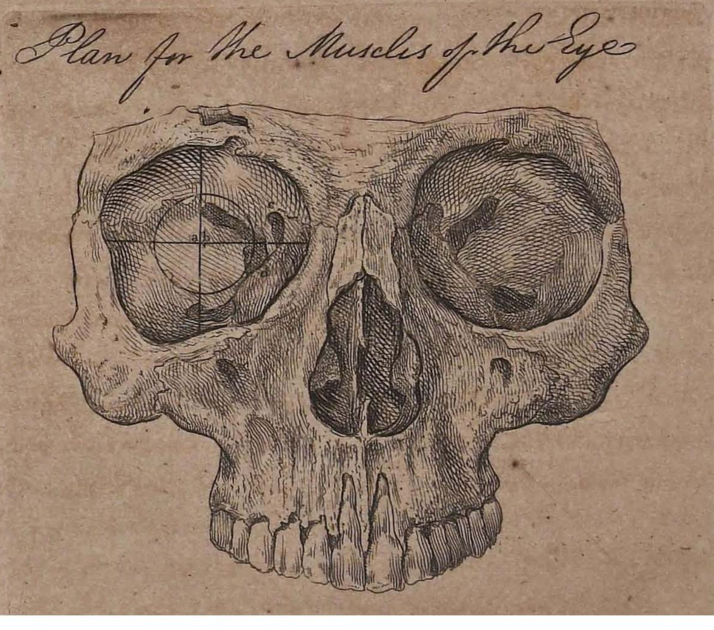
† Winflow, Academie des Sciences.

‡ Petit Acadamie des Sciences.

very manifeſt, that ſince the muſcles, to get at their inſertions muſt go round the globe of the eye; thoſe which go round by the outer ſide of the eye, or paſs under it, muſt be longer, while their antagoniſts which keep to the inner ſide of the eye or go over the globe, muſt be ſhorter. And ſo the Adductor Muſcle which is on the ſide next the noſe, is the only ſtraight muſcle; it is the ſhorteſt, while the Abductor is the longeſt. The Abductor and the Deprimens Oculi, are the longer muſcles of the eye: The Adductor and the Levator Oculi, are the ſhorter muſcles.

In this plan, the center of the ſocket (*a*) is marked by the croſſing of its two diameters. The center of the Pupil is marked at (*b*) nearer the inner angle of the eye, the Foramen Opticum is marked (*c*), and the inner end of the Foramen Lacerum is marked (*d*).

M In.



In FIGURE XII. these points are seen; (*a*) the ring which the Dura Mater forms, where it comes from the brain into the Orbit, accompanying the Optic Nerve; (*b*) the origin of the Obliquus Superior and Levator, from this part of the Dura Mater surrounding the Optic Hole. (*c*) The origins of the Abductor and Deprimens, but the letter (*c*) points more particularly to the origin of the Abductor, which is here seen to be a Biceps, or two headed muscle, having two Tendons, and the smaller nerves which belong to the muscles of the eye are seen at (*d*), passing betwixt these two tendinous origins of the Abductor. For it is to be remembered, that this Abductor along with two of the Recti, rises from that part of the Dura Mater, which covers the Foramen Lacerum; and that the small nerves enter the socket by the Foramen Lacerum.

From this root round the Optic Nerve, the muscles are seen going forwards.

1. The OBLIQUUS SUPERIOR or TROCHLEARIS (29) uppermost, the longest muscle of the eye with its slender Tendon passing through the Cartilaginous Pulley (*e*), which is left still in its place attached to the Superciliary Ridge of the Frontal Bone (*f*).
2. The OBLIQUUS INFERIOR, (30) is seen, the shortest muscle of the eye, arising from the lower part of the Orbit, and going backwards to antagonize the last.
3. The RECTUS SUPERIOR (25) next to the Rectus Internus which it hides, is the shortest muscle.
4. The RECTUS EXTERNUS (28) or Abducens Oculi, is the longest of all the straight muscles of the eye.
5. The RECTUS INFERIOR or DEPRIMENS OCULI (26) is shorter than the Abducens, (28) but longer than the Rectus Superior (25), because the Optic Nerve enters a little above the center of the Orbit. The Tendons of these Recti Muscles are seen expanding flat and broad upon the forepart of the eye; where by shining through that thin and Transparent skin, which covers the forepart of the eye, they form what is called the Albuginia, or white coat of the eye.

There

There remains but one mufcle belonging to the eye, and that is, the LEVATOR PALPEBRÆ SUPERIORIS (4); which is explained in FIGURE XIII. where it is feen rifing from the upper part of the Optic Hole at (*a*), along with the other mufcles; it lies over all the other mufcles, and expands into a thin and membraneous flefh (*b*), which runs imperceptibly into the fubftance of the upper eye-lid; and feems to end in (*c*) the Tarfus, or Cartilaginous hoop of the eye-lid.

The XIV FIGURE of this plate, explains the mufcles of the outward ear, as they are expreffed by COWPER. Where (17) marks the SUPERIOR AURIS or Atollens; and (19) the POSTERIOR AURIS or Retrahens, as they are explained in the book of the mufcles, p. 240.

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Etched by J. Bell

PLATE II.

This Plate explains the Text Book, from page 212, to page 231.

THIS plate belongs chiefly to the Throat; explains the Cartilaginous and bony parts, of which the upper part of the throat and eſpecially the flute part or Larynx is formed; ſhows the Os Hyoides; the Thyroid, Cricoid, and Arytenoid Cartilages; the Epiglottis; and the Membranes and Muſcles by which theſe Cartilages are connected, ſo as to form a rigid tube conſiſting of parts moveable upon one another, and yet ſo firm upon the whole, as to be a protection to all the more delicate parts of the throat, and to be the center of all the motions of the Jaws, and Tongue, and Windpipe, and Gullet; or of the Larynx and Pharynx, as they are called.

THIS Plate explains firſt all the individual parts one by one; and then joins them, ſhowing how the whole is compoſed; without which regular form of demonſtration, nothing could be clearly underſtood of parts ſo very intricate and difficult, and having ſo long a catalogue of hard names connected with them.

FIRST ROW.

The firſt row gives the parts ſingle and entirely diſſected; and there is repreſented,

(1.) The Os Hyoides, which reſembles in its general form the lower Jaw Bone of a child, or what is called the Thought Bone of a fowl; (*a*) is its baſis, (*b*) its horn, (*c*) the Cartilaginous joinings of the horns and body, and two little Tubercles ſtand perpendicularly up at the place of this joining, which are called the Cornua Minora or leſſer horns, or Appendices of the Os Hyoïdes. Theſe Cornua Minora are here repreſented in outline. The Os Hyoides is named alſo the bone of the Tongue, and its connections are eſpecially to be obſerved, *viz.* that it lies in th root of the tongue; forms in a manner the top piece of the Trachea, is tied by a membrane to the Thyroid Cartilage, has the Epiglottis (5.) or valve of the windpipe planted upon it. And that theſe connections may be underſtood, this bone is marked with this figure (1.) in all the other drawings.

(2.) Is the Thyroid or Shield-like Cartilage; which is indeed the ſhield of the Throat, for it is broad, flat, and very deep, and a full inch in length; it is thick, and often oſſified. And accordingly it is this broad Cartilage that defends the more delicate parts; its upper horns (*d d*), are tied to the Os Hyoides by a long ligament; its lower ones (*e e*) cloſely embrace the Cricoïd Cartilage. In this drawing, the Cartilage is ſet ſo as to reſt upon its two lower Cornua, and to ſupport and ballance it a common pin marked (*), was thruſt into it.

(3.) Is the Cricoid Cartilage; which is not, like the Thyroid, a ſemicircle merely, *i. e.* wanting at the back part, but is an entire ring which forms, as it were, the uppermoſt and firmeſt ring of the Trachea, but which ſtill belongs properly to the Larynx. It is ſhallow before, and very deep in the back part of its circle, plainly for the purpoſe of raiſing the Arytenoid Cartilages, (thoſe ſmall Cartilages which

which form the Rima Glottidis or opening of the windpipe); and by this deepneſs at its back part, the Cricoid Cartilage raiſes the opening of the Glottis ſo high, (as is ſeen figures vii. and viii.) that it is behind the very center of the Thyroid Cartilage where it is well defended and ſafe. The Articulating Surfaces upon which the Arytenoid Cartilages ſit down, are marked *(f)*.

(4.) The Arytenoid Cartilages, are the ſmall and moveable ones, which are of a Triangular form; they are ſet down upon the upper border of the Cricoid Cartilage, by their baſe (*g*) with a very moveable articulation; and (*g*) points to the ſocket ſurface of the Arytenoid Cartilage by which the articulation is formed. For here the two uppermoſt drawings of the Cartilage are ſet oppoſite to each other, almoſt in their natural poſitions, and reſting upon their baſis, while the loweſt drawing of the three, is turned up ſo as to ſhow its joint. The two ſharp points of the Arytenoid Cartilages ſtand perpendicularly upwards, and give the ſhape and opening of the Glottis. The tips of the two Arytenoid Cartilages are ſeen over the Thyroid Cartilage in figure viii. and the Cartilages are ſeen full in figure vii. ſettled in their place, and forming the Rima Glottidis or chink of the windpipe, which is narrower or wider as they are moved by their muſcles.

(5.) Shows the Epiglottis, which may be compared to an Artichoke leaf. It flaps down like a ſmall tongue or valve, and, by clapping neatly down upon the Rima Glottidis, makes the food and drink glide clear over the Glottis, and into the Gullet or Pharynx. The Epiglottis is repreſented in this drawing, ſo as to explain its connection with the Os Hyoides, and of courſe with the root of the tongue.

SECOND ROW.

The connections are explained in the figures of the ſecond row; each part preſerves its peculiar marks (1. 2. 3.) &c. and it is ſeen in figure vi. in what ſucceſſion theſe parts ſtand.

(1.) The

FIGURE VI.

(1.) The Os Hyoides, connected by its long horns with the upper horns of the Thyroid Cartilage. It is a ligament (*h*) of a full inch in length that connects them. And the common membrane of the Trachea is continued from the Os Hyoides, to the Thyroid Cartilage, ſo that the gap betwixt them is filled up by a ſtrong, but thin membrane (*i*).

(2.) The Thyroid Cartilage is next, it ſtands forwards in the throat to defend the other parts; is diſtinctly felt without; is the moſt prominent part of the throat; and named Pomum Adami.

(3.) Is the Cricoid Cartilage, which in this profile of the throat, is ſeen to be very ſhallow before, as it is deep behind.

The Arytenoid Cartilages, (4.) are neceſſarily hidden in this view; and the Epiglottis (5.) is cut away, to make this drawing more ſimple and eaſy.

The Thyroid Gland is marked (6.) the chief part of it is ſeen on the nearer ſide of the Trachea, and a part alſo of the right lobe is ſeen coming round from the other ſide behind the Trachea, and almoſt ſurrounding it. (7.) Marks the Trachea, and the figure is here made to point to the uppermoſt ring, that the true place of the Thyroid Gland might be underſtood, for it lies not upon the Thyroid Cartilage (2.) nor upon the Cricoid Cartilage (3.) as might be ſuppoſed, but upon the ſecond ring of the Trachea, leaving the firſt one free.

FIGURE VII. AND VIII.

ARE chiefly uſeful in explaining the places of the two Arytenoid Cartilages, and the way in which they form the opening of the Glottis.

FIGURE VII. The Os Hyoides is cut away. The Thyroid Cartilage (2.) is ſeen in its

its place, defending and concealing the Arytenoid Cartilages; or at leaſt the tips only of the Arytenoid Cartilages are ſeen (4.) peeping over the border of the Thyroid Cartilage. (3.) The fore-part of the ring-like or Cricoid Cartilage, is ſeen connected with the upper ring of the Trachea; but leaving an interſtice (*k*) of a triangular form, at which point, (and not betwixt the rings of the Trachea), Mr Vique D. Azir propoſes to perform the operation of Bronchotomy.

FIGURE VIII. Shows the back view of the ſame diſſection. The Os Hyoides is ſhown in outline, and in its true poſition with its ſmall ligament which connects it with the upper horns of the Thyroid Cartilage; and here it is explained how (1. 1.) the two horns of the Os Hyoides project far beyond the Larynx. They belong more properly to the Pharynx, "and hold the Pharynx extended, as we "hold a bag open with the finger and thumb."

(2, 2.) Show how deep the Thyroid Cartilage is; how fairly it incloſes the Cricoid Cartilage, and conceals and defends the Arytenoid Cartilages and the opening which they make; and here it is ſeen, that the edges of the Thyroid Cartilages belong alſo to the Pharynx, for the borders of the Thyroid Cartilage do, in fact, form part of the ſides of the Pharynx; they aſſiſt the horns of the Os Hyoides, in keeping the bag of the Pharynx extended. And the Conſtrictor Pharingis, (44. 45. 46.) the great Circular Muſcle which embraces the Pharynx, ariſes chiefly from the tips of the horns of the Os Hyoides, and from this projecting edge of the Thyroid Cartilage.

(3.) Is ſeen the great deepneſs of the Cricoid Cartilage behind, and it is ſeen by (4), how the Glottis (which is juſt the opening betwixt the two Arytenoid Cartilages), is raiſed by this deepneſs of the Cricoid Cartilage, in its back parts.

The third row of figures exhibits the more important of thoſe delicate muſcles by which the Cartilages are moved upon each other; but before theſe muſcles are explained, it is neceſſary to obſerve the place and effect of the Epiglottis, which is well ſeen in figure x. and by the aſſiſtance of this figure joined with the de-

monſtration of figure vi. the ſucceſſion of parts is very fairly explained.—1. The Os Hyoides.—2. The Thyroid Cartilage.—3. The Cricoid Cartilage follow each other in figure vi.—4. The Arytenoid Cartilages, figure vii. and viii.—5. The Epiglottis, figure ix.—6. The Thyroid Gland, figure vi.—7. The rings of the Trachea, betwixt which rings, and below the Thyroid Gland, the operation of Bronchotomy is to be performed.

This x. figure then compleats thoſe connections of the parts of the throat; and the effects of accidental wounds, or of the attempts of Suicides, or of our operation of Bronchotomy will be eaſily underſtood. Suicides in their attempts very commonly cut ſo high in the throat, immediately under the jaw, that they ſeldom wound the Carotid Artery; nor do they even hurt the more material parts of the throat; for they ſtrike ſo high, (commonly above the Thyroid Cartilage), that they do not touch the Trachea, nor injure the Glottis. They only cut off the Os Hyoides from the Larynx; they do not ſo properly cut the throat as the tongue; and when the food paſſes by the wound, it does not come from a cut of the Œſophagus acroſs the Trachea, but comes merely from the root of the tongue.

Theſe Lateral views explain alſo how idle it is to talk of performing Bronchotomy above the Thyroid Cartilage, ſince the Thyroid Cartilage is not in the Trachea, and ſince the obſtruction is below that point, being commonly in the Thyroid Gland, whcih is here marked (6).—Mr Vique D' Azir is not more correct in his Anatomy, where he adviſes Bronchotomy to be performed betwixt the Thyroid and Cricoid Cartilages, in the Triangular Membranous ſpace marked (*k*): for, that is exactly by the ſide of the Sacculus Laryngis, or Sac of the Larynx, a mucous ſecreting bag, which lies here on the inſide of the Trachea; and the Trocar would lie almoſt in the opening of the Glottis, or ſo near it, that the irritation could not be endured. The Larynx cannot bear the operation of Bronchotomy, becauſe it is moveable, furniſhed with many muſcles that are eaſily excited; and the leaſt irritation near the Glottis, throws them into violent contractions. But the Trachea itſelf, can eaſily bear to be transfixed

transfixed with the Trocar, which neither excites contractions, nor gives pain: Besides the obstruction which requires Bronchotomy, is seldom in the tongue or mouth; more commonly in the Larynx; not unfrequently in the Thyroid Gland. So that almost all the occasions that can be supposed, are such as keep us down to the very lowest point of the Trachea, *viz.* That nearest the chest.

THIRD ROW.

This row is for demonstrating the chief muscles of the Larynx, and Pharynx; and of course, the motions of these several parts upon each other. And it explains, first, the muscles which lie immediately upon the Cartilages of the Larynx, and which move the parts of the throat upon each other; and these lead to a knowledge of those longer muscles, which come from the jaws, or chin, or sternum, or shoulder; and by which the whole throat is moved. These are represented carefully in the middle figure of this third row, and also in the next plate.

FIGURE IX. Explains chiefly the Hyo-thyroidæi, and Crico-thyroidæi Muscles; for first, The CRICO-THYROIDÆI (42), arise by a small pointed origin, (*l*) from the fore part of the Cricoid Cartilage; go upwards and obliquely outwards about an inch in length; are implanted by a broad insertion (*m*), into the lower border of the Thyroid Cartilage, and where they end, the next muscle begins. For the HYO-THYROIDÆUS (41), is a long, flat, and fleshy muscle, about an inch and a half, or two inches in length; lying flat upon the smooth face of the Thyroid Cartilage; rising from the lower border of the Thyroid Cartilage below, and implanted broad and fleshy above, into the basis of the Os Hyoides a little to one side, and to a part of the horn. Sometimes this muscle is divided into two slips, as it is drawn by Cowper, but more commonly it is single, as represented here, and the upper end of the Sterno-hyoideus (34), is seen here marked with its proper number.

The Sterno-hyoideus is implanted into the Thyroid Cartilage, at the point where the Crico-thyroideus (42) ends, and the Hyo-thyroideus (41) begins; ſo that the Crico-thyroidæus is in part covered by the Sterno-thyroideus; and the Hyo-thyroideus again looks like a continuation of the ſame muſcle.

In FIGURE X. are ſeen chiefly the ſmall muſcles by which the Cartilages of the Larynx are moved upon each other, modulating the voice. And the chief of theſe are, firſt, the CRICO-ARYTENOIDEUS POSTICUS, and ſecondly the ARYTENOIDEUS TRANSVERSUS.

The Crico-arytenoideus Poſticus (45), " is a ſmall Pyramidal Muſcle, which riſes " broader from the back part of the Cricoid Cartilage, where the ring is broad " and deep; and going directly upwards, is implanted with a narrow point into the " back of the Arytenoid Cartilage. This pair of muſcles pulls the Arytenoid " Cartilages" backwards and outward, ſo that they at once lengthen and widen the ſlit; enlarging the opening of the Glottis. Under this lies the Crico-arytenoideus Lateralis, the ſmalleſt of theſe muſcles, which ariſes from the rim of the Cricoid, and is inſerted into the root of the Arytenoid Cartilage, and plainly ſeparates the Arytenoid Cartilages, and widens the Glottis.

The ARYTENOIDEUS TRANSVERSUS, (43) is ſeen here. It is ſeen croſſing betwixt the two Arytenoid Cartilages, going from the root of the one, to the root of the other; its natural office being to contract, or occaſionally to cloſe the Glottis.

The ARYTENOIDEUS OBLIQUUS, is a very delicate muſcle which lies under this, in the ſame way that the Arytenoideus Obliquus lies under the Arytenoideus Poſticus *.

The XI. FIGURE explains the Conſtrictores Pharyngis, and the Styloid Muſcles; for (*n*) repreſents the Velum Pendulum Palati, cut off from the roof of the mouth, and

* The young ſtudent ſhould carry the throat to his room, waſh it in a hand baſon, ſteep and diſſect there.—A piece of Anatomy, which with theſe drawings he will eaſily manage, which is hardly uncleanly, and cannot but be very important. It is indeed neglected only from being thought impracticable.

and hung out by ſtrings; (*o*) is the UVULA or Pap, in the centre of it; (*p*) is the Anterior Arch of the Palate; (*q*) is the Poſterior Arch; (*r*) is the Tonſil lurking betwixt the arches at the ſide of the root of the tongue; (*s*) is the tongue; (1.) is the Os Hyoides; (2.) is the Thyroid Cartilage; (3.) the Cricoid Cartilage; (6) the Thyroid Gland; (*t*) the Trachea; (*u*) a piece of wood thruſt up through the Œſophagus, and appearing again in the throat at the back part of the tongue; and the great conſtrictor muſcle, is ſeen going in waves round this piece of wood; or in other words, courſing round the upper part of the Œſophagus, *i. e.* the Pharynx; and (*v*) is the laſt point of this demonſtration, and the moſt important, for it is the Styloid Proceſs, whence (39.) (53.) and (58.) the three Styloid Muſcles ariſe *.

The muſcles then which are to be ſeen in this drawing of the throat are, 1. The ſet of the three Styloid Muſcles; 2. the Conſtrictor Pharyngis; and 3. the Vaginalis Gulæ.

The Styloid Muſcles are, the STYLO-GLOSSUS (58.) ariſing from the forepart of the Styloid Muſcle, and going forwards into the ſubſtance of the tongue, ſtretching forwards into its point for drawing it back into the mouth.

The STYLO-HYOIDEUS (39), which begins rather from the backpart of the Styloid Proceſs, and goes here into the ſide of the Os Hyoides, being ſlender at its beginning, and broad towards its inſertion, as all the Styloid Muſcles are.

The STYLO-PHARINGEUS (53.) lies behind or under the Stylo-hyoideus; for it lies cloſe upon the Gullet or Pharynx, expands upon that part of the bag where it is held extended upon the horns of the Os Hyoides; ſo that the Stylo-pharyngeus, when it expands upon the Pharynx, touches the horn of the Os Hyoides, which is marked (*x*), and as the middle conſtrictor of the Pharynx ariſes eſpecially from that

* The Stylo-gloſſus I had deſcribed in my book of the muſcles; but after claſſing it in the general arrangement, I had forgotten it in the deſcription of individual muſcles.

that point of the Os Hyoides, the lower fibres of the Stylo-pharyngeus run alongside of the upper fibres of the middle conſtrictor, ſo that they almoſt mix.

Theſe three Styloid Muſcles perform the firſt movement in the act of ſwallowing, for they all coincide in lifting up the throat, preſſing back the root of the tongue againſt the palate, (to ſtraiten the Arches of the Fauces;) and confining the morſel. By compreſſing the morſel, they puſh it down, and ſo begin that action, which is compleated by that ſtrong Muſcle of the Pharynx, which is next ſeen.

For the Constrictor Pharyngis, (55.) is a very large and fleſhy muſcle, which covers five inches (in length) of the Œſophagus, and puſhes down the morſel, which is already preſſed by the contractions about the top of the Pharynx, and chiefly by the action of the Styloid Muſcles. The Conſtrictor is fairly enough divided into three muſcles, (54. 55. and 56.) of which the upper one, which cannot be ſeen here, riſes about the back of the jaws, and from the baſis of the ſkull, and from the root of the tongue.

The Middle Constrictor, marked (55.) riſes from tips of the horns of the Os Hyoides alone, and goes in a diverging form upwards, till it almoſt touches the ſkull, and downwards pretty low upon the Gullet.

The Lower Constrictor (56.) ariſes from the borders or wings of the Thyroid Cartilage, and from the ring of the Cricoid Cartilage. This is the thickeſt and fleſhieſt of all the Conſtrictors; it is very large, and goes obliquely upwards, covering the lower part of the middle Conſtrictor, and a ſmall ſpace is left, a kind of angle betwixt the two Conſtrictors, which is thin and membranous, and there the tips of the horns belonging to the Thyroid Cartilage, are faintly indicated, as ſhining through the thin membrane.

The Œsophagus is ſtill farther covered with a ſheath of muſcular fibres, which run in a perpendicular direction longitudinally along it, till they expand at laſt upon the ſtomach itſelf. This ſheath of muſcular fibres is called the Vaginalis Gulæ, and is marked (57.)

PLATE

VIII
VI
VII
IX
XI
X
XIII
XIV
XII

PLATE III.

This Plate explains the Text Book, from page 217, to page 220.

THIS Plate explains the connection of the mufcles of the throat; it explains chiefly the greater mufcles coming upwards from the breaft and fhoulder; or downwards from the Styloid Procefs, pulling the throat upwards towards the jaws, or downwards towards the Sternum; and thefe mufcles, though they belong chiefly to the throat, do occafionly move the jaws.

IN FIGURE I. which reprefents the head of an old man, the fkin of the neck is diffected off, and cut away, nearly in the line of the Jaw Bone; fo as to fhow, (*a*) the Jaw Bone; (*b*) the Parotid Gland, lying behind the angle of the jaw; (*c*) the Submaxillary Gland, lying under the corner of the jaw; (*d*) the Great Carotid Artery, which carries blood to the head; (*e*) the Great Jugular Vein, by which that blood is returned; (*g*) is the Thyroid Gland, which confifts of two lobes, one lying upon the right fide of the Trachea, the other upon the left fide, the two lobes are joined by a narrow flip of the Glandular fubftance which lies upon the fore-part of the Trachea, and is called the ISTHMUS, *i. e.* neck betwixt the two lobes, joining together the two lobes of the Gland. The Gland is large, where the bulk of it can lie at either fide of the Trachea; but its Ifthmus marked (*g*) is very thin, and almoft

membranous,

membranous, where it lies upon the fore-part of the Trachea. We find the Gland smaller in men, larger in women; of great variety in respect of size; very generally so large, as to be distinguished by the fingers on the outside of the throat; very often enlarged, and often descending deep behind the Trachea, so that the two opposite lobes almost meeting behind, surround that Tube, and explain to us how terrible and how incurable (by any operation at least), that suffocation must be, which proceeds from a swelling of this Gland. This form of the Gland almost surrounding the Trachea, the two opposite lobes nearly meeting behind, is better explained in the Trachea, drawn at Figure vi. Plate ii.

The parts of the Trachea, with which the muscles are more immediately connected; are,

(1.) The Os Hyoides, which lies in the root of the tongue.

(2.) The Thyroid Cartilage, where it projects to form the Pomum Adami.

(3.) The Cricoid Cartilage, which is above the Thyroid Gland. Therefore the Thyroid Gland is hardly entitled to the name of THYROID, since, in place of resting upon the Thyroid Cartilage, it lies quite below both the Thyroid and Cricoid Cartilages, upon the first, or rather upon the second ring of the Trachea.

THE MUSCLES ARE THESE,

(137.) is the STERNO MASTOIDEUS, the great muscle of the neck; thrown back to expose those smaller muscles which belong properly to the throat; and there is seen,

(34.) The STERNO-HYOIDEUS, coming up from the Sternum, going upwards to the Os Hyoides, long, flat, ribband-like, and bending where it passes over the Thyroid Gland.

(35.) The STERNO-THYROIDEUS, coming also upwards from the Sternum; stretching towards the Thyroid Cartilage; lying under the last named muscle; like it flat and ribband-like; covering also the Thyroid Gland, and bulging a little where it passes over the chief bulk of the Gland.

(36.) The OMO-HYOIDEUS, coming upwards from the shoulder. It is a digastric or two-bellied

two-bellied muſcle. The belly (36.) is fixed into the Os Hyoides. The middle tendon (*b*) is ſeen under the Maſtoid muſcle; and the lower fleſhy belly lies too deep to be ſeen, for it riſes from the Scapula near the Coracoid Proceſs.

Theſe are the chief muſcles which pull the throat DOWNWARDS.

The muſcles which pull the throat UPWARDS are the MYLO-HYOIDEUS, the BIVENTER, and the STYLO-HYOIDEUS muſcles.

(37.) The MYLO-HYOIDEUS ariſes from the whole length of the Jaw Bone, from the chin to the angle; and it ariſes not from the lower border of the jaw; but rather from the inner ſurface of the jaw-bone, almoſt as high as the ſockets for the teeth. It is thick and fleſhy; but ſtill it is flat and broad; and goes downwards in a radiated or fan-like form, to be implanted into the baſis of the Os Hyoides. Within this muſcle lies hidden the Genio-Hyoideus; without, lies the fore belly of the Digaſtric Muſcle; the Sub-maxillary Gland (*c*) is an external Gland, and lies under the corner of the jaw without, (*i. e.*) over the Mylo-hyoideus; the Sub-lingual Gland is an internal Gland which lies under the tongue beneath this muſcle. The Mylo-hyoidei muſcles of oppoſite ſides are united to each other by a rapha or tendinous ſeam or line, which is ſeen at (*i*), and which goes down from the center of the chin to the center of the Os Hyoides.

(40.) The BIVENTER MAXILLÆ INFERIORIS belongs after all more properly to the throat than to the jaw; it is called Biventer from its two bellies, which are indeed very diſtinct and beautiful; one belly (*k*) ariſes from the root of the Maſtoid Proceſs, and ſo is ſeen here coming out from under the Parotid Gland; the fore-belly (*l*) is ſeen ariſing from under the chin; the middle tendon has the number of the muſcle (40.) put upon it at that point where it paſſes the ſide of the Os Hyoides, and there it is attached to the Os Hyoides, not merely by running through a ſort of Cartilaginous loop on the ſide of that bone, but alſo by running through a loop made by the fleſh of the Stylo-Hyoideus muſcle, which forks at its inſertion.

(39.) Is the STYLO-HYOIDEUS coming from under the Parotid Gland, and implanted in-

to

to the ſide of the Os Hyoides, and ſo binding down the middle tendon of the digaſtric muſcle.

In this drawing then, are ſeen the chief muſcles which affect the general poſition of the throat, *viz.*

1. The Sterno-Hyoideus (34.), Sterno-Thyroideus (35.), and the Omo-Hyoideus, (36.) pulling the throat downwards.
2. The Mylo-Hyoideus (37.), the Stylo-Hyoideus (39.), and the Digaſtricus (40.), pulling the throat upwards.

One ſmall muſcle remains to be explained; it is the Crico-thyroideus (42.), which ariſes from (3.) the Cricoid Cartilage to be inſerted into (2.) the Thyroid Cartilage.

FIGURE II.

Is the head of a woman, the neck long, the ſlender muſcles of the throat much diſſected and thrown out, very looſe and flaccid; and the Thyroid Gland was in this ſubject particularly large, hung very low down, and made a conſiderable bending in the two long muſcles which run over it. This drawing is a freer diſſection of theſe muſcles, where all the Anatomy of the throat is ſeen; for the Parotid Gland, the Carotid Artery, the Jugular vein, the eighth pair of nerves, and the chief muſcles both of the throat, and of the tongue, are here.

The Jaw Bone is here, as in the former figure, marked (*a*); the Parotid Gland (*b*); the Carotid Artery (*d*); the Jugular vein (*e*); and the Thyroid Gland, which appears only at two points, and almoſt covered by the muſcles, is marked (*g*). But the moſt important parts in the Anatomy of the neck, are the Carotid Artery (*d*); the Jugular vein (*e*); and the Par Vagum, or eighth pair of nerves (8.) This eighth pair is a long nerve, which goes from the head down to the ſtomach to end there. It is marked (8.); it is ſeen here, lying upon the great Jugular vein, which

is

is turgid with blood, and bulging out in the form of a dilated inteſtine: the eighth pair of nerves goes down along with the Carotid Artery and Jugular vein, they being all incloſed in one common ſheath of Cellular Subſtance, which is here diſſected away, to ſhow theſe parts clean.

The Os Hyoides is marked (1.); the Thyroid Cartilage is marked (2.); the Cricoid Cartilage is hidden by the muſcles.

In this drawing, the Sterno-maſtoideus (137.) is very fully diſſected, is made flaccid, and is laid to one ſide, ſo as to ſhow the muſcles of the throat freely; which for the ſake of a clear demonſtration, I ſhall divide into three ſets. 1. The muſcles from the Sternum, which pull the throat downwards. 2. The Digaſtric and the Styloid Muſcles, which pull the throat upwards. 3. The muſcles which make the fleſh of the tongue, the chief part of its bulk.

I. The muſcles coming upwards from the Sternum and ſhoulder are,

(34.) The Sterno-hyoideus, which is ſeen in all its length, ſtretching from the Sternum to the Os Hyoides, and bending over the Thyroid Gland.

(35.) The Sterno-thyroideus; exactly like this, lying behind and under it, proceeding from the Sternum to end in the Thyroid Cartilage, and alſo bending over the Thyroid Gland.

(41.) Is the place where the Sterno-thyroideus ends; and the Thyro-hyoideus begins; this (41.) then, is like a continuation of the ſame muſcle, while it is really a diſtinct one, named THYRO-HYOIDEUS (41.) becauſe it goes from the Thyroid Cartilage, to the Os Hyoides.

(36.) Is the OMO-HYOIDEUS, of which the fleſhy belly is marked, as in the other drawing (36.) while its middle tendon is marked (*b*).

2. The

II. The muſcles which pull the throat upwards are,

(40.) The Digaſtricus, of which the firſt belly (40.) is ſeen coming out from under the Thyroid Gland, while the fore belly (*n*) being cut away from the chin, hangs down.

(39.) The Stylo-Hyoideus Muſcle, which is ſeen turning over the tendon of the Digaſtricus, and tying it down in its place.

(53.) The Stylo-pharyngeus, which lies very deep behind the other Styloid Muſcles, paſſes down under the arm or branch of the Os Hyoides, and expands upon the Pharynx.

N. B. In this drawing, the Styloid Muſcles are diſſected upwards very nearly to that point (under the Parotid Gland,) where they riſe ſmall and delicate, from around the roots of the Styloid Proceſs.

III. The muſcles which compoſe the chief bulk of the tongue, are theſe,

(58.) The Stylo-gloſſus, which comes ſmall and delicate from the root of the Styloid Proceſs; expands as it goes towards the tongue, and whoſe office is to pull the tongue down into the mouth.

(59.) The Hyo-glossus, which I have repreſented as one ſingle flat muſcle, riſing from nearly the whole length of the Os Hyoides *.

(60.) Is the Genio-glossus, ſo named from its riſing from that point of the lower jaw bone (*o*), which is called the chin; its fibres go into the tongue in a radiated form, in every direction, capable of performing all kinds of motions, of lolling the tongue out, and alſo of retracting it again; whence this muſcle has by way of pre-eminence

be

* From its ariſing in three faſciculi or diſtinct bundles, *viz.* one from the baſis, one from [illegible] orn, and one from the Cartilage of the Os Hyoides, it has been called the Baſio-chondro-cer[illegible]us, or each faſciculus has occaſionally been deſcribed, as a diſtinct muſcle.

been named Mufculus Linguæ Pollychreftus. And (*r*) is the tongue itfelf, compofed chiefly of thefe mufcles, and covered with its membrane.

The Genio-hyoideus (38.) is a mufcle rifing from the fame point (*o*), of the chin; is implanted into the Os Hyoideus. This mufcle which rifes from the point of the chin only, lies under the Mylo-hyoideus (37.) (*vide* Figure i.) which rifes from the whole length of the jaw; and thefe together pull the Os Hyoides, and of confequence the throat upwards.

So that there is feen by thefe two drawings, firft, how the Mylo-hyoideus, (37.) figure i. and the Genio-hyoideus, (38.) figure ii. pull the throat upwards. Secondly, how the Digaftric Mufcle (40.) and the three Styloid Mufcles, figure ii. pull the throat upwards and backwards. Thirdly, how the Sterno-thyroidei, Sterno-hyoidei, and Omo-hyoidei pull the throat downwards. And it is laftly very plain, that thefe at the fame time that they are properly mufcles of the throat, are occafionally mufcles of the lower jaw, the only ones indeed which pull it down; little force is needed for this, the jaw dropping almoft by its own weight; but, as the motion muft be quick and voluntary, it muft be done by mufcles; and when the mufcles from the Sternum fix the throat or pull it down, the Genio-hyoidei, Mylo-hyoidei and Biventer deprefs the jaw; fo that the motions of the jaw and throat, or in other words, the action of chewing and fwallowing have this confent, that they are partly performed by the fame common mufcles, fo that we cannot chew and fwallow at once; the jaw which moves in chewing the morfel, muft be fixed when it is to be fwallowed; and fo the motions for chewing and fwallowing alternatively fucceed each other.

PLATE

I II

MUSCLES Pl. III.

PLATE IV.

This and the two following Plates explain the Text Book, from Page 232, to Page 285.

THIS plate explains thoſe broad muſcles, which, belonging to the Scapula, lie flat upon the back, covering the whole of the trunk, and which are very remarkable in beautiful ſtatues. The muſcles are chiefly the TRAPEZIUS, and the LATISSIMUS DORSI; and this drawing is not ſo much of value as a piece of Anatomy, as in explaining to the ſtudent the firſt appearance of his diſſection of the back; and by explaining the great muſcles of the Scapula, it marks a good beginning for the Anatomy of the arm.

THE TRAPEZIUS MUSCLE, (62) " is one of the moſt beautiful muſcles of the body, of " a Lozenge-like form. Covers all the back and neck quite round to the fore-part of " the ſhoulder; the two muſcles extend from the tip of the one ſhoulder, to the " tip of the other, and from the nape of the neck quite down to the loins." The ſtrong middle tendon by which the two muſcles of the oppoſite ſides are connected, is marked (*a*), the inſertion into the Occiput is marked (*b*), and the inſertion into the ſpine of the Scapula, is marked (*c*).

" The LATISSIMUS DORSI, (70.) it is the broadeſt not only of the back, but of the " whole body, covering all the lower parts of the back and loins." Its broad; flat,

and

and gliſtening tendon is marked (*d*), the chief belly of the muſcle is marked with its number (70.); the place where its fibres croſs is marked (*e*), and it then runs under the arm into the deep ſhadow, being implanted into the arm bone to pull the arm backwards.

The DELTOIDES (71.) next appears, the ſkin being thrown down careleſsly, ſo as to ſhow where this muſcle riſes from the Spine of the Scapula; and eſpecially its origin is ſeen; for it riſes from the Spine of the Scapula (*c*), and in part from that line of the Scapula into which the Trapezius Muſcle is inſerted.

A ſmall part of the TERES MAJOR, (76.) is ſeen in the ſpace betwixt the Deltoides, and the Latiſſimus Dorſi; a ſmall part of the INFRA-SPINATUS, (74.) is ſeen lying upon the Scapula, under this (the back) part of the Deltoid; and alſo a ſmall part of the Rhomboides, (65.) is ſeen under the edge of the Trapezius Muſcle. Upon the haunch, the upper part of the great Gluteus Muſcle (163.) is ſeen uncovered by the ſkin, which hangs like a ſcroll over the edge of the table.

PLATE

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PLATE V.

This Plate with the IV. & VI. *explains the Text Book, from Page* 232, *to Page* 285.

THIS plate ſhows the arm in that poſture into which it naturally falls, when thrown out upon the table, *viz.* ſtanding upon the lower angle of the Scapula, the ſhoulder joint raiſed, and a little ſupported, the elbow touching the table, the fore-arm lying flat along the table, the wriſt raiſed by the box of knives thruſt under it, and the hand dropping over the box, ſo as to touch the table again, with the knuckles.

FIGURE I. deſcribes the outtermoſt layer of Muſcles. Figure II. (a fuller diſſection,) explains thoſe which lie under, and contains every muſcle quite down to the bone. The two drawings are explained as one, ſince they are indeed two drawings of the ſame arm in one poſture; and the moſt natural arrangement for this explanation is, 1. Of the muſcles lying on the Scapula, and moving the ſhoulder bone. 2. Muſcles lying on the arm, and moving the Radius and Ulna, the two bones of the fore-arm, and 3. The muſcles which lie upon the fore-arm, and which move the wriſt, and fingers, and thumb.

1. MUSCLES

I. Muscles lying upon the Scapula.

There is ſeen here, the part of the Serratus Major Anticus Muſcle, (66.) which lies upon the fore-part of the cheſt, which goes backwards under the Scapula, betwixt it and the ribs; and which is implanted, as is ſeen here, into all the line of the Baſis of the Scapula, to pull it forwards. The place where the Supra-spinatus (73.) lies, above the Spine, is ſeen filled with its muſcle in the upper drawing, and the place of that muſcle is ſeen empty, and with only naked bone in the lower drawing.

The Infra-spinatus, (74.) is ſeen both in the upper and in the lower drawing, covering all that part of the Scapula, which is below the Spine.

The Teres Minor, (75.) is ſeen both in the upper and in the lower drawing, lying in its place not much diſſected, and ſo little ſeparated from the Infra-ſpinatus (74.) that it looks rather like a particular faſciculus of that muſcle, as indeed it is; but though the Teres Minor is not in its fleſhy belly eaſily diſtinguiſhed from the Subſcapularis, yet it has its tendon very diſtinct.

The Teres Major, (76.) is neither like the Teres Minor, nor is it round as its name imports, but is a large, flat, and long muſcle which comes along with the Teres Minor, from the angle of the Scapula, and being here fully diſſected, and hanging flabby, it is ſeen, that it twiſts under the ſhoulder bone, and is implanted, not like the Teres Minor, which goes into the knob on the outſide of the head of the ſhoulder bone; but low down, and upon the ſhaft of the bone, almoſt as low as the inſertion of the Deltoid Muſcle; ſo that the ſhoulder bone is embraced betwixt the two Teretes Muſcles, even in the natural condition of the parts; and in the aukward twiſtings of a luxation, the head of the bone is often cloſely embraced and ſtrangled, as it were, betwixt the two Teretes muſcles, and not unfrequently under the ſubſcapularis; an accident which makes the bone more difficult to reduce; but very often the

the joint is not at all embraced by the mufcles, but is quite loofe and moveable, and its being eafily reduced, is rather perhaps to be confidered as a fign of the joint being much hurt and all thefe mufcles torn away.

(71.) Is the DELTOIDES, the laft mufcle which proceeds from the Scapula on this fide of the arm. It is feen here rifing from the Spine of the Scapula (*a*), from the tip of the Acromion Procefs (*b*), and alfo it has an origin from a part of the clavicle. It is feen here implanted in the arm bone at (*d*), about one third down. In the upper drawing it lies in its place; in the lower drawing it is cut up and turned backward, to fhow the head of the bone, and the infertion of the Teres Minor.

But there are ftill two other mufcles which rife from the Scapula, to be implanted into the arm bone, *viz.* the SUBSCAPULARIS, (77.) and the Coraco-brachialis, (72.) which are both feen in the next plate.

II. The Mufcles moving the fore-arm, and which lie upon the arm, are the Triceps and Anconeus behind, and the Biceps and Brachialis Internus before.

The Triceps (80.) was once defcribed as three mufcles, but is now accounted as one mufcle, having three heads; (*e*) the firft, a long head, which rifes from the lower edge of the Scapula, near the Glenoid Cavity; and, coming down betwixt the Teres Major, and the Teres Minor Mufcles (75.) and (76.) meets the fecond head which is fhorter; for the fecond head of the Triceps (*f*), rifes from the fhoulder bone, a little below the head of the bone, and takes a long origin from almoft the whole length of the humerus. In thefe two drawings, the firft and fecond head only of the Triceps is feen; but in the next plate, the third or fhorteft head (*g*) of the Triceps is feen, coming rather from the inner fide of the bone, and lower down.

The ANCONEUS, (81.) or Mufcle of the Elbow, is a fmall mufcle not very eafily found nor underftood. It lies exactly upon that part of the elbow on which we reft in leaning upon the arm. It is feen in the upper drawing only, and is marked with its number (81).

(78.) The Biceps, the Thick Mufcle of the fore part of the Arm, is feen in the upper figure. But the middle of its belly only is feen; its heads lying under the Deltoid Mufcle. The Brachialis Internus, (79.) which lies under the Biceps, is feen in the uper drawing, but it is better feen in the lower drawing; and the manner of its rifing from the fore part of the fhoulder-bone is tolerably well expreffed. Neither of the heads of the Biceps can be feen in the upper drawing, becaufe of the Deltoid Mufcle; but in the lower drawing, where the Deltoid is cut up from the Scapula, and reclined backwards, the longer head of the Biceps is feen raifed upon the blow-pipe, (*b*) which is paffed under it juft where the tendon is coming out from the Capfule of the fhoulder joint; for this head of the Biceps is a long and flender tendon, which comes from within the cavity of the fhoulder joint, and goes down under the belly of the Deltoid Mufcle, being tendinous quite to the middle of the arm.

The mufcles of the Fore Arm are arranged in my defcription of the Mufcles under two claffes.

I. The Extenfors of the wrift, fingers, and thumb, which all keep the outer round fide of the fore-arm, arifing chiefly from the outer Condyle.

II. The Flexors, or Benders of the wrift, fingers, and thumb, which lie all upon the inner flat fide of the fore-arm, rifing in their turn, chiefly from the inner Condyle. In thefe drawings the extenfors only can be feen; in the drawings of the next plate all the flexors are feen.

To begin then with the Mufcles lying upon the upper or radial edge of the fore arm, there is,

(92.) The Supinator Longus Radii, which turns the palm of the hand up; for it rifes from the fhoulder bone, above the elbow joint, and goes down the fore-arm with a long flat tendon, which is marked (*i*) to be planted into the Radius at its fore-part.

(102.) The Supinator Radii Brevis, is a deeper Mufcle, and therefore it is feen only

only in figure ii. where it is ſeen lying cloſe upon the Inter-oſſeous Ligament, riſing from the Ulna, going acroſs to be inſerted broad and fleſhy into the Radius, and turning the Radius upon the Ulna, ſo as to throw the palm upwards.

The two next muſcles keep alſo very exactly to the Radial edge of the arm; belong to the wriſt; are the extenſors of the wriſt on the Radial ſide of the arm; and are named Extenſores Carpi Longior et Brevior.

(93.) The Extensor Carpi Radialis Longior, riſes from the arm bone juſt under the place of the Supinator Longus (92.); has a ſtrong fleſhy belly like it; and its long tendon accompanies the long tendon of the Supinator, and is implanted near the root of the thumb, at (*k*), to bend the wriſt back.

(94.) The Extensor Carpi Radialis Brevior, riſes alſo from the ſhoulder bone, but lower, and thence it is ſhorter; but it is in all other reſpects like the former; like it has a ſhort thick fleſhy belly; a long and ſlender tendon, running along the wriſt, is implanted into the back of the hand, at the root of the fore-finger, at (*l*); and like the former it bends the wriſt backwards.

Theſe three muſcles, the Supinator, and the two extenſors, form the chief fleſh of the fore-arm juſt under the elbow joint, and the three bellies make three dimples and three curious ſwellings, which are drawn by the painter with great care, for they make the chief marks of the fore-arm; and the true drawing of the fore-arm (in its bendings and fore-ſhortenings, and eſpecially in its ſtrong exertions of pulling or graſping,) conſiſts chiefly in the right placing of theſe three bellies, where they cover the joint; and it is the riſing belly of the Supinator, which (in the drawing), joins the fore-arm rightly to the arm. Theſe three muſcles are ſeen lying in their places in the upper drawing, but flaccid. In the lower drawing, the Supinator, (92.) is cut away, and the place, whence it was cut out from the arm-bone, is marked with its number (92.), while the long Extenſor (93.) and the ſhort Extenſor (94.) are both left in their place; but they are much diſſected, and allowed to hang

over by their own weight to the inner ſide of the fore-arm, ſo that in this lower drawing their tendons are leſs perfectly ſeen.

(95.) The EXTENSOR CARPI ULNARIS is ſeen in the upper drawing diſſected very clean, lying looſe and flabby, but yet not ſeparated from the Ulna; whereas in the lower drawing it is ſo fully diſſected, as to fall away from the Ulna, leaving the bone at *(m)* naked.

And ſo there remains of all the muſcles on this ſide of the fore-arm, thoſe only which extend the fingers and thumb; and they are all ſeen, in the upper drawing, diſſected, but ſtill in their places. In the lower arm they are all thrown looſe.

(96.) The EXTENSOR COMMUNIS DIGITORUM is ſeen in the upper drawing thick and maſſy; covering the other ſlender muſcles. This muſcle goes to all the fingers, by the tendons *(n n)* which are ſeen on the back of the hand. In the upper figure the Extenſor Communis is in its place; in the lower drawing it is cut up, and thrown out upon the table.

(97.) EXTENSOR DIGITI MINIMI vel Auricularis is ſeen only in the lower drawing, for in the upper drawing it is covered by the Extenſor Communis. It is like a ſlip of the Extenſor Communis, and conſequently it is cut up here along with the Extenſor Communis.

The ſlender tendons of the Extenſor Communis are marked (*n n.*) The ſlender tendon of the Auricularis is marked (*o.*) But the fore finger alſo has a particular Extenſor, which is named Indicator, and the thumb has three Extenſors, named 1*ſt*, 2*d*, and 3*d*.

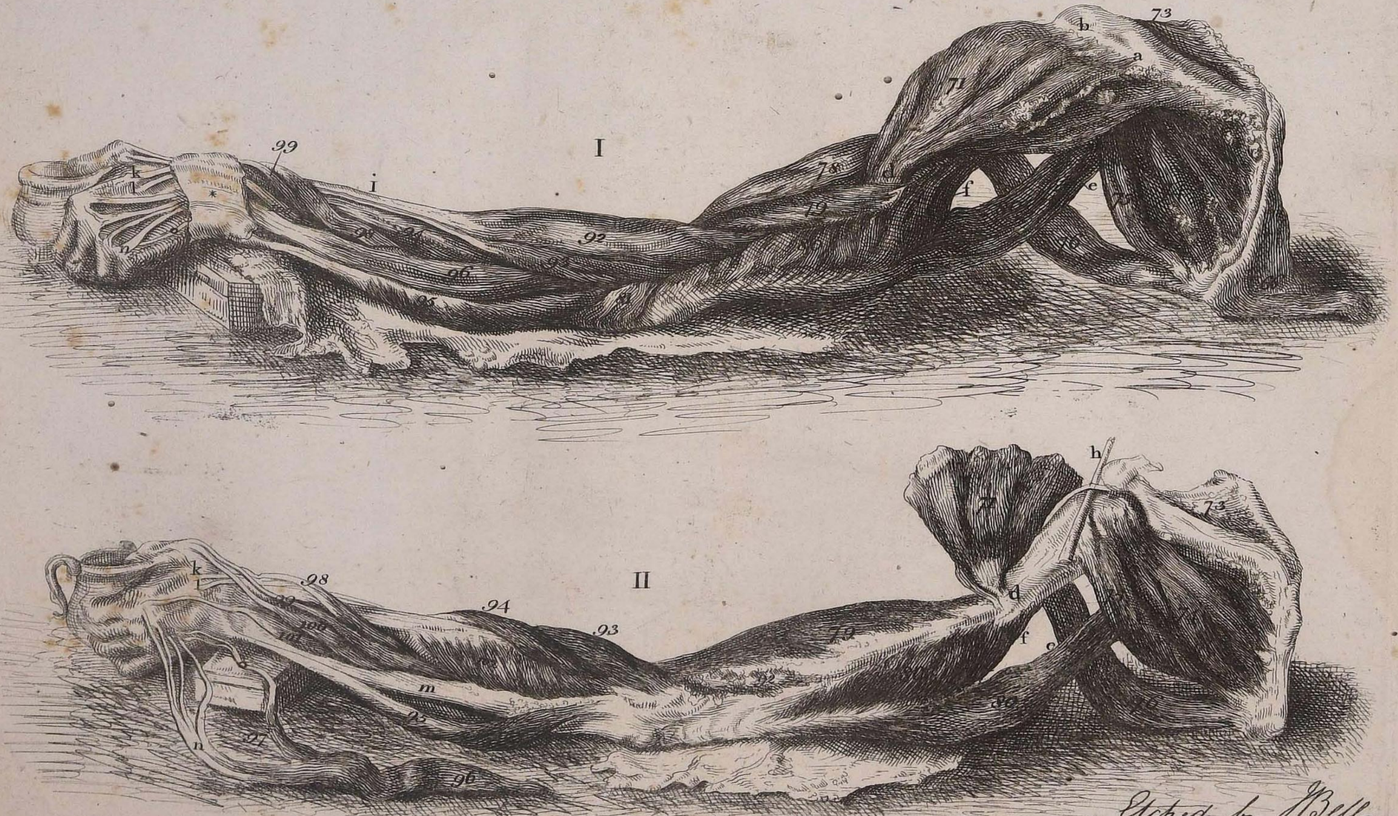
(98.) The EXTENSOR PRIMUS POLLICIS is the firſt upon the edge of the arm, paſſing obliquely over the Radius (99.) The EXTENSOR SECUNDUS is next to that; and the EXTENSOR TERTIUS (100.) is next to that again. Theſe three Extenſors are ſeen fully diſſected in the lower drawing, hanging looſe, and their ſlender tendons diſtinctly ſeen. In the upper drawing they are leſs diſſected; and the manner in which the three tendons croſs obliquely over the wriſt, and the manner of their coming up to the thumb touching the great joint of it, is well explained. It is ſeen here that theſe tendons are

bound

bound down by the Annular Ligament (*); and by raifing the thumb ftrongly in our own hand, we can compare it with this diffection, for we fee the ftarting up of thefe tendons of the thumb, and we fee at the fame time the point diftinctly marked at which the ring of the Annular Ligament holds them down.

The INDICATOR (101.) lies next to the Extenfor Tertius Pollicis; it rifes from the Ulna; its flender tendon goes up to the fore-finger to extend it. This mufcle is feen only in the lower drawing. In the upper drawing all the mufcles are in their natural places, the tendons being bound down by the Annular Ligament which is marked (*). It is a tendinous expanfion, thin, flat, and ribband-like, and the mufcles extending the fingers are feen through this tranfparent band. It is called the Annular, or Ring-like Ligament of the wrift.

PLATE



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Etched by J Bell

PLATE VI.

This Plate explains the Text Book, from page 217, to page 220.

THIS plate explains all the flexor mufcles of the hand, wrift, and fingers, by a drawing taken when the arm was fet up for the figures of the laft plate, and confequently the poftures are exprefly the fame; and the parts, as the SCAPULA, the CLAVICLE, and the pofition of the fore-arm muft be eafily underftood.

THE Seratus Major Anticus (66.) is ftill feen hanging down from the bafis of the Scapula. Part of the Supra-fpinatus (73.) is feen above the Spine. Below the Spine is feen the Infra-fpinatus.

The SUBSCAPULARIS (77.) is feen filling the whole of the hollow of the Scapula, lying der the Scapula, betwixt it and the ribs.

The TERES MAJOR (76.) is feen here alfo hanging down flaccid from the place, where it is implanted into the fhoulder bone.

That part of the DELTOIDES (71.) which rifes from the Clavicle (*a*) is feen here.

The BICEPS BRACHII (78.) is feen in the upper drawing with the belly marked (78), lying in its place. Its longer flender tendon which comes from within the fhoulder joint is marked (*b*). Its fhorter tendon which ftill is very long but thick and flefhy,

 is

is ſeen marked (*c*), coming from under the Deltoid muſcle where it riſes from the Coracoid Proceſs. Its flat tendon, which expands upon the fore-arm, and ſtrengthens the general faſcia of the arm, is ſeen ſpreading out over the muſcles at (*d*), and the ragged edges of the faſcia are ſeen lying out upon the muſcles, for the muſcles both above and below are diſſected clean, while the faſcia of the arm is left only at (*d*), that the connection betwixt this faſcia and the Biceps tendon might be explained.

In the lower drawing the ſhorter head of the Biceps (*c*) is ſeen cut away from the Coracoid Proceſs (*e*), and hung up by a ſtring. The longer head (*b*) is pulled upwards by a ſtring, that it may be ſeen how it comes from under the clavicle, where it riſes within the ſhoulder joint. The Coracoid Proceſs whence the ſhorter head ariſes is marked (*e*), and it is ſeen that there are three points of muſcles ſticking to the apex of the proceſs; for the little pectoral muſcle (67.) is implanted into it; and the Coraco-brachialis (72.) and this ſhorter head of the Biceps riſe from it.

The Brachialis Internus (79.) is ſeen in both arms, lying under the belly of the Biceps, and riſing from the bone.

The Coraco-brachialis (72.) is ſeen in both the drawings. In the upper drawing it is touched by the ſhort head of the Biceps, which makes it leſs diſtinct. In the lower drawing the ſhort head of the Biceps is tucked up. The Coraco-brachialis is fully diſſected, and is left flaccid and hanging away from the arm bone; and its origin from the Coracoid Proceſs (*e*), and its inſertion into the middle of the ſhoulder bone at (*g*) are both well ſeen.

Over the middle of the bending of the Coraco-brachialis there is ſeen the remains of a flat and broad tendon, (69.) ſticking to the arm bone, which is the cut tendon of the great pectoral muſcle, which is implanted thus low upon the Os Humeri, to give it the advantage of a lever in pulling the ſhoulder bone inwards. I have uſed the mark (69.) of the pectoral muſcle to point out its tendon.

The Triceps (80.) is alſo well ſeen, eſpecially two of its heads, viz. the longeſt head (*f*,) and the ſhorteſt head (*g*), while the head which is of a middle length lies upon the back part of the bone, and cannot be ſeen in this view.

The

The mufcles of the FORE-ARM, *i. e.* all the Flexors of the hand, fingers, and thumb, are fhown here; in the upper drawing, they are in their natural pofition, in the lower drawing, they are feparated for demonftration, and fome of them are hung out.

In the upper drawing, the mufcles of the fore-arm are few and fimple, lying regularly in their places; and fo are eafily underftood.

One mufcle belonging to the outfide of the arm is feen here, *viz.* the SUPINATOR RADII LONGUS, (92.) the belly of which is feen lying upon the Radial edge of the arm, above the elbow; the next to that is the PRONATOR TERES, (82.) It rifes at (*h*), from the internal Condyle; is implanted into the Radius at (*i*), and turns the hand prone, (*i. e.*) flat down. It is called Pronator Teres, becaufe it has a round flefhy belly, very oppofite in fhape to the Pronator Quadratus; for the PRONATOR QUADRATUS, (91.) which is feen in the lower drawing is of a fquare form, lying flat upon the Inter-offeous Membrane, rifing from the Ulna, implanted into the Radius, and having only one direct office, *viz.* that of turning the Radius.

The next mufcle to the Pronator Teres, is the FLEXOR CARPI RADIALIS, (85.) or the bender of the wrift, on the fide of the Radius. Its head is covered in part by the expanding tendon of the biceps at (*d*); then the reft of the mufcle is naked; and its long tendon is feen as it goes along the Radial edge of the fore-arm marked (*k*).

The PALMARIS LONGUS, (83.) is a long, flender, and delicate mufcle; it is merely a bender of the wrift; and comes by a fmall head from the inner Condyle of the Humerus, and its fmall tendon runs down the middle of the arm till it touches the Anular Ligament of the wrift, to be implanted into it. This Anular Ligament I have marked (*); but though it has the fame mark with the Anular Ligament on the outfide of the arm, it is not a continuation of the fame Ligament, nor is it like it; but is a fhort, thick, and very ftrong ligament paffing acrofs from the Pifiform, to the Scaphoid bone of the Carpus. It is fhorter and ftronger than the Anular Ligament of the outfide; it has a firmer origin from two particular bones,

and has a deeper arch under it: for the tendons which it binds down are very numerous, and connected with much ſtronger muſcles than thoſe on the back of the hand.

The Flexor Carpi Ulnaris, (86.) lies along the ulnar edge of the arm; is a penniform or feather-like muſcle, very fleſhy; riſes from the inner Condyle along with the Palmaris Longus, (83.) and is implanted by a ſtrong round tendon into the projecting Piſiform Bone.

The Flexor Digitorum Sublimis, (87.) is a very large thick bellied muſcle. It is called Sublimis, becauſe it is the outtermoſt of the two flexor muſcles. It is ſeen here lying in its place, thick and fleſhy in its belly; its tendons paſſing under the arch of the Anular Ligament, appearing in the palm of the hand, to go to all the fingers; there are four diſtinct tendons, which are here ſupported upon a blow-pipe marked *(m)*; and the place of the Flexor Profundus, which lies under, it is ſeen at (88.)

In the lower drawing, the muſcles of the fore-arm are ſeen much freer and better.

The Pronator Teres (82.) is ſeen in its place, thick, round, and fleſhy.

The Palmaris Longus, (83.) is thrown out upon the table; by which it is ſeen how ſhort and delicate its muſcular belly is; how long, ſlender, and delicate its tendon (*n*), from which it has got its name. And the Palmar Apponeuroſis, or tendinous web, (*l*), which covers the palm of the hand, and which like the palm is of a triangular form, is here cut up and left connected with its tendon.

The Upper Flexor of the fingers, or Flexor Sublimis, (87.) is ſupported by a ligature, ſo as to draw its four tendons nearly into a ſtraight line, ſhowing how they are ſplit near the fingers, whence this muſcle is often named Perforatus.

The deep Flexor, Flexor Profundus, (88.) is left at its origin. Its belly is raiſed and drawn out a little, and held extended by a pin; and the three tendons of this muſcle are ſeen going through the loops, or ſplits of the tendon of the laſt muſcle, whence this one is named Muſculus Perforans.

The

These tendons of the Perforans and Perforatus are alſo well ſeen in the uppermoſt figure, where the perforating tendons are raiſed over the blowpipe (*o*), and the perforated tendons are alſo ſupported upon another blowpipe (*m*).

The muſcle marked (88 *) which ſeems to go with a particular tendon towards the fore-finger, as if it were a particular Flexor for the fore-finger, is merely that head of the general Flexor which goes to the fore-finger, it is a part of the Flexor Profundus; and this particular appearance is produced merely by diſſecting this belly a little too high up; for this muſcle, and the Flexor Sublimis alſo, are divided or diviſeable into four diſtinct bellies, for each of the four diſtinct fingers which they ſerve.

The FLEXOR LONGUS POLLICIS, (90.) is a large and ſtrong muſcle for bending the laſt joint of the thumb; its tendon is ſeen going in under the two ſhort muſcles of the thumb, and is ſeen again at (*q*) eſcaping from betwixt the ſhort Flexors, and going forwards to the point of the thumb.

The PRONATOR QUADRATUS, (91.) is ſeen lying flat upon the Interoſſeous Membrane which is marked (*p*).

The muſcles of the HAND are not fully explained, but yet the chief muſcles are ſeen.

The ABDUCTOR BREVIS POLLICIS, (103.) is ſeen in the upper drawing riſing from the outſide of the Annular Ligament.

The FLEXOR BREVIS POLLICIS, (105) is ſeen riſing alſo from the Annular Ligament. Another head riſes deeper in the hand, but is not ſeen here, there is ſeen only the tendon of the long Flexor, paſſing betwixt theſe two heads of the ſhort Flexor.

The OPPONENS POLLICIS, (104.) cannot be ſeen here, becauſe it does not move any of the joints of the thumb. It belongs only to the Metacarpal Bone of the thumb; and of courſe it lies under theſe two.

The ADDUCTOR POLLICIS, (106.) or, that which carries the thumb towards the fore-finger, is alſo ſeen here; but ſo much under ſhadow, that it is not to be diſtinguiſhed from the ABDUCTOR INDICIS, (110.) For the Adductor Pollicis and

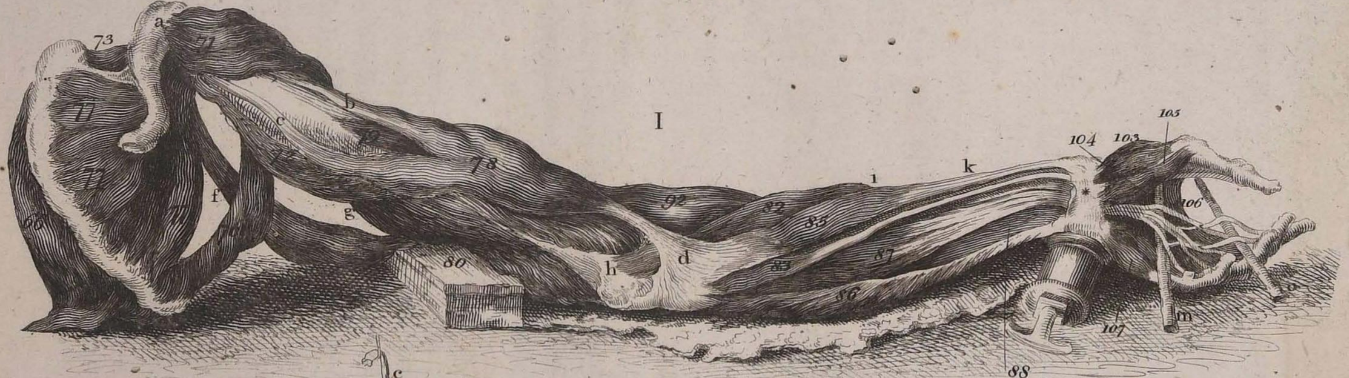
 Abductor

Abductor Indicis lie close upon each other, and are of the same flat and triangular shape.

The muscles of the little finger are, the Abductor and the Flexor Minimi Digiti; but it is the ABDUCTOR MINIMI DIGITI (107.) only that is seen here, lying on the edge of the palm, under the little finger; which we feel acting, when we spread wide the little finger, or when taken with that slight cramp which we often feel upon the lower edge of the palm.

PLATE

I



II

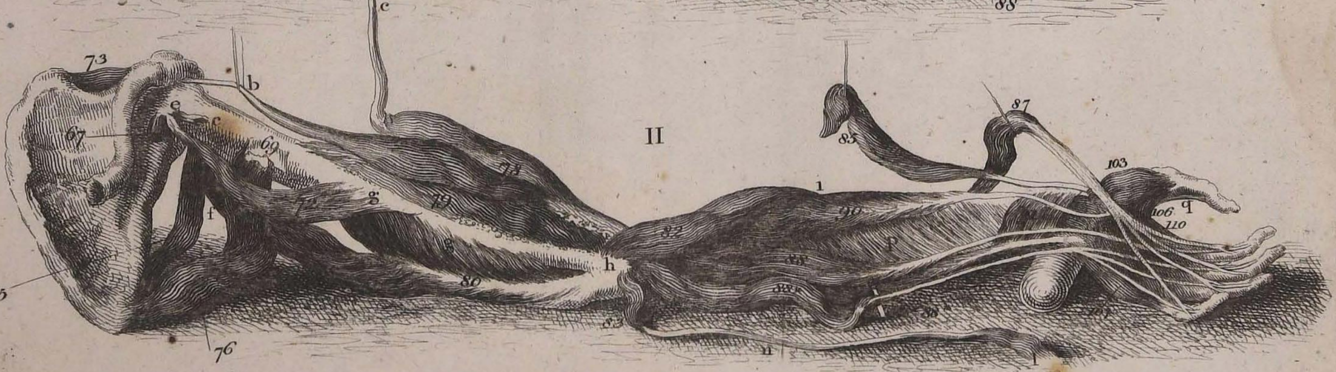


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PLATE VII.

This Plate explains the Text Book, from Page 235, to Page 310.

THIS plate repreſents the Trunk of the body in various drawings; explaining thoſe muſcles of the Scapula, which lie flat under the Trapezii Muſcles;—alſo the ſerrated muſcles, which raiſe or depreſs the ribs in breathing; the LONGISSIMUS DORSI, and Sacro-Lumbalis, the chief muſcles which ſupport the Spine; and it alſo explains the Intercoſtal Muſcles; the Levators of the ribs; the leſſer muſcles of the neck and Spine; and the RECTI CAPITIS, the ſmall nodding muſcles of the head.

IT explains a ſet of muſcles, which are found in the book from page 235, to page 310. From page 235 of the book, forwards, are explained the chief muſcles of the Scapula; as the Levator Scapulæ, the Rhomboid Muſcles, and the Serratus Anticus; and theſe three are the chief outermoſt muſcles in the diſſection repreſented in figures i. and ii.

The LEVATOR SCAPULÆ, (63.) is ſeen in Figure I. on both ſides, riſing from the Tranſverſe Proceſſes of the upper Vertebræ of the neck, and going downwards to be implanted into the upper corner of the Scapula, whence it is named Muſculus Angularis Scapulæ.

The RHOMBOID muſcles, (64, and 65.) are two flat muſcles which come with a thin flat

flat tendon from the Spines of the neck and back, and are implanted quite fleſhy, but ſtill thin and flat, into the whole length of the baſis of the Scapula. The diviſion betwixt the cervical portion of this muſcle, (64.) which is the RHOMBOIDES MINOR, and the larger portion coming from the Spines of the back, and which is named RHOMBOIDES MAJOR, (65.) is very ſlight.

Part of the INFRA SPINATUS, (74.) is ſeen here; the DELTOIDES, (71.) is alſo ſeen; the SERRATUS MAJOR ANTICUS, (66.) or great muſcle for moving the Scapula forwards, is ſeen lying upon the ſide of the cheſt, riſing from the ribs to paſs under the Scapula, where it is implanted into the whole length of the Baſis of the Scapula, exactly oppoſite to the inſertion of the Rhomboides. But in Figure II. the Serratus Major Anticus is repreſented again lying under the Scapula; and the Scapula, to ſhow it, is cut almoſt away from the trunk, and is thrown out into a very unnatural poſition, and the confluence of the ſeparate heads or Serræ by which this muſcle riſes from each of the ribs is indiſtinctly marked.

Thus the SERRATUS ANTICUS is ſeen to be a muſcle belonging to the Scapula; but the SERRATI POSTICI, (113. 114.) are muſcles of the ribs belonging chiefly to reſpiration, and they are ſeen in Figure I. and theſe muſcles of the ribs are explained in the book from page 285, to page 290. The upper Serrated muſcle lies flat under the RHOMBOIDES; the lower Serrated muſcle lies in like manner flat under the Latiſſimus Dorſi muſcle; but they cover the LONGISSIMUS Dorſi and SACRO-LUMBALIS muſcles, the lower Serratus covering their fleſhy bellies, and the uppermoſt covering their tendons.

The SERRATUS SUPERIOR POSTICUS (113.) is ſeen lying flat upon the ſide of the neck; on the right ſide the RHOMBOIDES covers it; on the left ſide it is ſeen naked. It begins by a neat flat ſhining tendon, reſplendent like the colours of a fiſh turning in the water; and this flat tendon (which is exactly like the flat tendon of the Rhomboid muſcle) comes from the three lower Spines of the neck, and divides into three neat ſmall fleſhy heads which are marked (*a a*), and theſe are implanted into three

of

of the ribs ; and by raiſing three ribs it is plain that they muſt raiſe the whole cheſt.

The SERRATUS INFERIOR POSTICUS (114.) is the exact antagoniſt of this, and exactly like it in all reſpects, only that it goes obliquely from below upwards, to pull the ribs down. It ariſes by a ſilvery ſhining tendon like the upper one ; the tendon is very ſtrong, but thinner than a ſheet of paper. It ends in three heads, which are thin flat ſlips of fleſh, inſerted into the three or four lower ribs a little beyond their angles.

The LEVATORES COSTARUM, (115.) are concealed by theſe muſcles, but are ſeen in the next diſſection, Figure II. where they are ſeen to be in number twelve pairs correſponding with the number of the ribs. The nine uppermoſt are ſeen to be ſhort ; the three lower pairs are ſeen to paſs one rib, and to take hold on the rib below. Whence they are named LEVATORES COSTARUM LONGIORES.

The Levatores Coſtarum are theſe twelve diſtinct muſcles, riſing from the tranſverſe proceſs of each vertebra, and going down to lay hold upon each rib ; and ſo they lie flat upon the outſide of the ribs, and keep cloſe to the Spine, and are ſhort. But there are beſides regular plans of fibres lying in the interſtices of the ribs, which go from the edge of one rib to the edge of another, and fill up the ſpace betwixt the ribs and hence are named INTERCOSTALS. The internal intercoſtals exactly reſemble the external intercoſtals. The external intercoſtals only can be ſeen here, and they are ſeen beſt in the left ſide of figure ii. marked (116.) the three lower internal intercoſtal muſcles lying upon the three lower ribs are longer than the others, juſt as the lower Levators are longer ; but it is not ſo in the outer layer of intercoſtals which (except in a few ſtraggling fibres) are all of equal length.

The muſcles which raiſe the trunk from the ſtooping poſture, and eſpecially the QUADRATUS LUMBORUM, SACRO-LUMBALIS, LONGISSIMUS DORSI, TRANSVERSALIS COLLI, and CERVICALIS, are explained from page 297, to page 301. and they are all pretty diſtinctly marked in figures i. and ii.

In FIGURE I. the LONGISSIMUS DORSI (126.) and the Sacro Lumbalis (127.) are ſeen only in the middle of the back ; for they are covered by the Rhomboid and Serratus

ſuperior

superior muscles above, and in the same way by the Serratus inferior Posticus below; but in figure ii. the three great muscles of the Spine, *viz.* the QUADRATUS LUMBORUM (125.) the LONGISSIMUS DORSI (126.) and the Sacro-Lumbalis (127.) are seen quite uncovered, and in their whole length; for their tendinous origin in the loins at *(b)*, their middle bellies at (126, 127.) and their long tendinous insertions at *(c)*, are all distinctly seen; and also their connection with the CERVICALIS DESCENDENS (128.) is explained.

The QUADRATUS LUMBORUM, (125.) which is cut away on the right side, is seen distinctly on the left side, arising big and fleshy from the Spine of the Ilium, and inserted partly into the transverse processes of the loins, but chiefly into the lowest rib.

The common tendon of the Longissimus Dorsi, and of the Sacro-Lumbalis, is seen at *(b)*; it is a firm, thick, and strong origin, which is thus entirely tendinous without, but fleshy within; it rises from the SACRUM, ILIUM, and transverse processes of the Vertebræ, and fills up all the hollow upon both sides of the Spine.

The belly of the SACRO-LUMBALIS (127.) parts from the belly of the LONGISSIMUS DORSI, (126.) at the top of the loins, nearly opposite to the lowest rib.

The Longissimus Dorsi keeps closer by the Spine, and is inserted by a double row of tendinous feet; but they lie so under its own belly, and under the belly of the Sacro-Lumbalis, that they are hidden from the view. The tendinous feet of the SACRO-LUMBALIS are well seen, spreading out wider from the Spine and attaching themselves to the ribs; and these tendons marked *(c c)* are seen in figure i. lying flat and regular, each in its right place; but in figure ii. they are more dissected, are torn up a little from the flat surface of the ribs, and hang somewhat loose and flaccid. On the right side of the neck is seen the CERVICALIS DESCENDENS, (128.) rising from the transverse processes of the neck, going down to be implanted tendinous into the back, (*i. e.*) into the ribs. The Cervicalis is inserted under the upper tendons of the Sacro-Lumbalis, and the Longissimus Dorsi, on the other hand, is seen to send a delicate slip of tendon up into it; so that the Cervicalis seems equally connected with both

both of theſe muſcles, but it is rather more beholden to the Longiſſimus Dorſi, for this ſlip; while the accident of the Cervicalis riſing under the tendinous feet of the Sacro-Lumbalis makes hardly any connection.

On the left ſide again there is ſeen, the TRANSVERSALIS COLLI (129.); which riſing from the Tranſverſe Proceſſes of the back, aſcends towards the Tranſverſe Proceſſes of the neck; it is rather ſtrong and fleſhy, has little connection with any other muſcle; the Cervicalis Deſcendens lies under it, while this the Tranſverſalis is in its turn covered by the Splenius and Complexus *.

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* There are three ſlender muſcles in the neck, which are in danger of being confounded, *viz.* the TRACHELO-MASTOIDEUS, the TRANSVERSALIS CERVICIS, and the CERVICALIS DESCENDENS. It is impoſſible to give a perfect drawing on ſo ſmall a ſcale, nor indeed is it poſſible by any drawing, to repreſent them ſo that they ſhall be eaſily found, and diſtinguiſhed; perhaps they will beſt be found by following this order of diſſection. 1. The Trapezius and the Rhomboides, the two large flat external muſcles belonging to the Scapula, are to be cut away; and then the Serratus Superior where it covers the lower part of the Complexus is to be raiſed. 2. The Splenius and Complexus are to be diſſected and laid aſide; and 3. the Trachelo-maſtoideus, and the two other muſcles come into view. Of theſe, FIRST, there lies immediately under the Complexus the Trachelo-maſtoideus, large and fleſhy, riſing from the Tranſverſe Proceſſes in the back and lower part of the neck, by tendinous and fleſhy feet, and going obliquely upwards and outwards till it is implanted fleſhy into the Maſtoid Proceſs; and though it is more fleſhy than the two muſcles which come next, it ſtill is ſo much a mixture of tendon and fleſh, as to be named the Complexus Minor.—SECONDLY, There is the TRANSVERSALIS CERVICIS, which lies immediately under the Trachelo-maſtoideus, keeps cloſe to the Spine, *i. e.* lies in the hollow by the ſide of the Spinous Proceſſes. It riſes from the Tranſverſe Proceſſes of the back to be implanted in the Tranſverſe Proceſſes of the neck; is immediately covered by the Trachelo-Maſtoideus; and covers in part the Cervicalis Deſcendens.—THIRDLY, there is the CERVICALIS DESCENDENS, which lies more to one ſide than the Tranſverſalis Cervicis; it therefore lies more properly under the Trachelo-Maſtoideus; its feet or tendinous origins begin from the tips of the Tranſverſe Proceſſes of the neck, juſt where the feet or ſmall tendons of the Levator Scapulæ begin; it is very ſlender and is a confuſed mixture of tendon and fleſh, being chiefly tendinous, though it is fleſhy in part. It is neceſſary to give this warning, that not even the largeſt drawing can make this piece of diſſection perfectly eaſy; perhaps it may be the eaſier for this deſcription and arrangement.

The riſing ſlip of the Longiſſimus Dorſi has led to this explanation of the Tranſverſalis, and of the Cervicalis Deſcendens; but naturally before theſe, there ſhould have been explained the two larger muſcles which cover them, *viz.* the Splenius and Complexus, which are beſt ſeen in figures i. and iii. In figure i. are ſeen, the SPLENII (118.) ſtraight and flat, lying along the ſide of the neck, like the legs of the letter V. and in the interſtice or place of their forking, is ſeen the chief belly of the COMPLEXUS, (119.) where it is implanted into the Occiput, lying under the Splenii. In figure iii. the Splenii are cut away, the Complexus only is ſeen, the chief belly of the Complexus where it is implanted into the Os Occipitis is marked with its proper number (119.); while its feet (partly tendinous and partly fleſhy), by which it riſes from the Tranſverſe Proceſſes of the neck and back, are marked (*e e*).

The muſcles belonging excluſively to the Spine, are next ſeen in figure iii. for the chief of them are theſe two, Firſt, the SPINALIS DORSI, (131.) or long muſcle belonging to the Spinous Proceſſes of the back. It runs along the whole back from ſpine to ſpine; it is very ſlender and almoſt entirely tendinous, and is marked with its number, (131.) Secondly, the MULTIFIDUS SPINÆ, (133.) which is a confuſed mixture of tendon and fleſh, but thick and maſſy enough to fill all the hollow over the Oblique Proceſſes of the Vertebræ, and betwixt the Spinous and Tranſverſe Proceſſes.

Three of the four ſmall muſcles which perform the quick turning and nodding motions of the head, are explained upon the head, figure iv. where the two ſmall muſcles called RECTI CAPITIS are ſeen diſſected fairly, and laid over a blow-pipe; and here it will be obſerved that the two RECTI MINORES (121.) are ſmaller, and lie deeper betwixt the Atlas and the Scull; that the RECTUS MAJOR (122.) is not, as its name implies, a ſtraight muſcle, but is truely oblique. One of the Oblique muſcles is alſo ſhown here, for there are two oblique muſcles, ſomewhat like the Recti or ſtraight ones. The Oblique Muſcle (123.) which is here ſhown, is the

Obliquus Superior, which rises from the Transverse Process of the Atlas, to be inserted into the Occiput. The Obliquus inferior, which rises from the Dentatus to be fixed into the Atlas is here cut away, for only the Atlas is left in this drawing.

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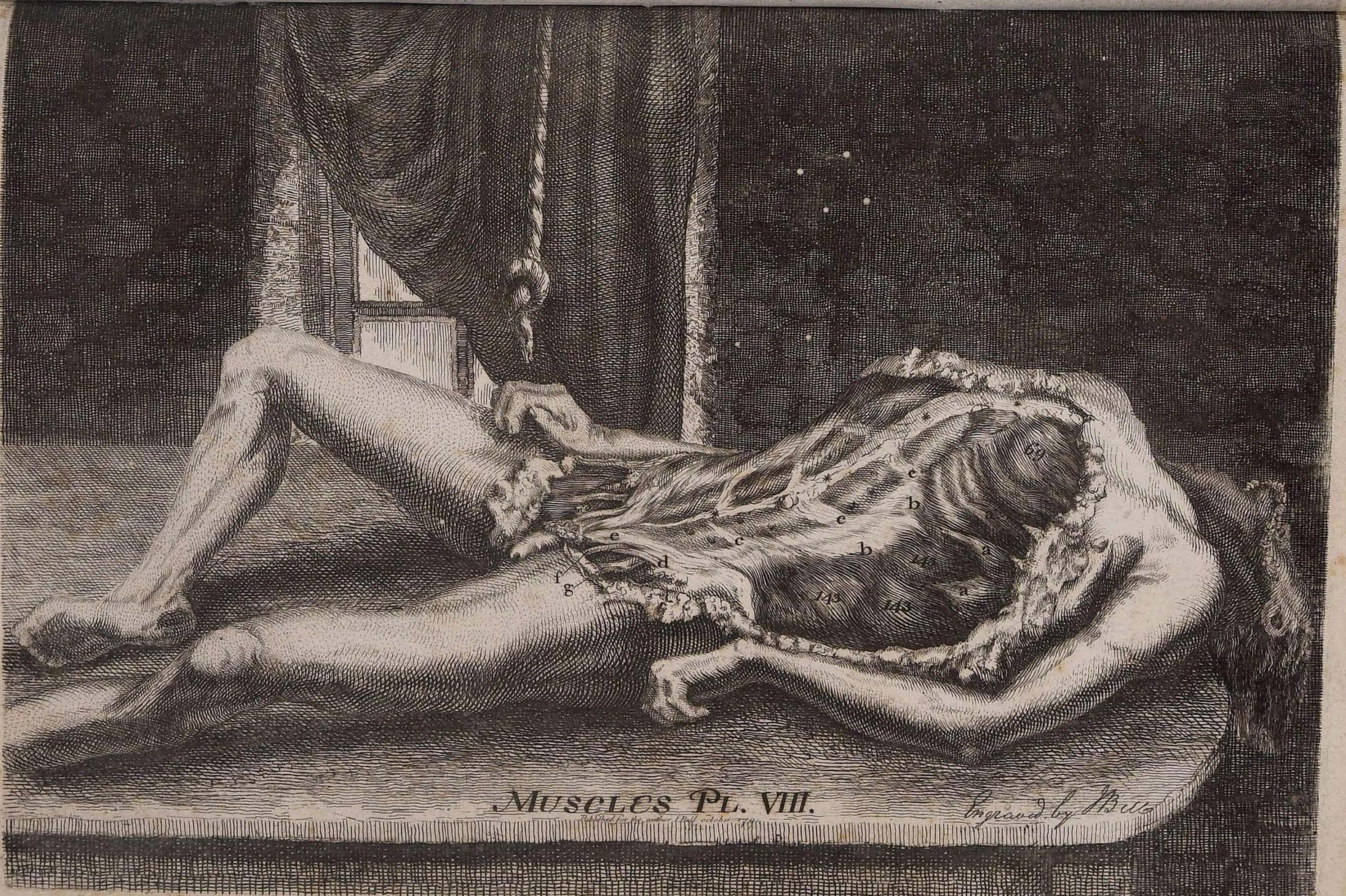
MUSCLES PL. VIII.
Engraved by J. Bell

The drawings and plans which are numbered, VIII. IX. X. & XI. explain chapter vi. and vii. of the book, containing the Abdominal Muſcles, the Diaphragm, and the muſcles of the Perineum.

Plate VIII. gives a general view of the Abdominal Muſcles, as they are firſt laid open. Plate IX. gives a ſecond diſſection of the Abdominal Muſcles, ſhowing the ſucceſſive layers of the great Muſcles which cover the Abdomen. Plate X. explains the general appearance of the Diaphragm, and its relation to the body. Plate XI. explains by plans and drawings, the Diaphragm and the muſcles of the parts of generation.

PLATE VIII.

EXPLAINS the firſt diſſection of the Abdominal Muſcles in a lateral view; and the chief intention of the drawing is, to ſhow the general appearance of the belly when uncovered of its ſkin; to ſhow the great ſize of the Muſculus Obliquus Externus, " and how it covers all the ſide with " its fleſhy belly, and all the fore-part of the Abdomen with its thin " expanded tendon;" to explain the two great lines or marks, the Linea Alba, and Linea Semi-lunaris, and to ſhow the ring of the Abdominal Muſcles, and the ligament of the thigh in their true ſhapes, with the exit of the great arteries of the thigh, and the paſſage of the Spermatic Cord.

THE deſcription then of theſe few parts needs not be tedious.

Firſt, the great belly of the EXTERNAL OBLIQUE Muſcle of the ABDOMEN is marked with its proper number (143.); and it is ſeen here how it covers the ſide, how it lies out upon the fore-part of the Thorax, and how it riſes from the ribs by indigitations,

tions, which are marked fo dark that they can be underftood only by the indigitations (*a a a*) of the Serratus Major Anticus Mufcle, in the interftices of which they rife.

The belly of this mufcle covers only the fide, ftops fuddenly at (*b b*), which reprefent the flat tendon, the fibres of which go obliquely from above downwards and inwards, where it is named OBLIQUUS DESCENDENS. The letters (*c c c*) fhow the line which is called LINEA SEMI-LUNARIS; and the letters are fo placed, as alfo to point out the interfections or tendinous lines which divide the Recti, or ftraight mufcles of the Abdomen, into four or five diftinct bellies; and confequently the letters (*c c c*) alfo mark the feveral bellies of the Rectus, fhining through the thin expanded tendon of the External Oblique.

(*) Marks the head of the Rectus Mufcle, where it rifes from the border of the Thorax, touching the PECTORAL MUSCLE (69.), and at the place of this mark (*), the mufcle is uncovered of its fheath; this mark ferves alfo another ufe, for it is repeated again below near the navel, fo that thefe two marks fhow the whole length of the LINEA ALBA, or white line, which is feen running down all the center of the belly from the Sternum quite to the Pubis, paffing through the navel, and formed by the meeting of the tendons of all the mufcles. And it is perhaps worth notice, that the fmall holes marked very dark, which are neat, fmall, and round, and which appear in every diffection, like Oilet Holes, and are efpecially frequent over the furfaces of the Recti Mufcles, are juft the openings by which the great Cutaneous Veins of the Abdomen pierce the flat tendon of the External Oblique Mufcle, to get to the bellies of the Mufcles which lie under it, or rather to come back from them, returning chiefly the blood of the Epigaftric Artery †.

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† I queftion whether it be not truely a wound of one of thefe large veins, (and they are greatly dilated in dropfy of the belly), which occafions that kind of bleeding, which fo often happens in tapping the belly.

The tendency of the Oblique fibres of the Abdominal Muſcle to ſplit is eaſily ſeen, and the manner of its ſpliting to form the RING of the ABDOMINAL MUSCLES is faithfully repreſented, where (*d*) marks the lower pillar of the ring; (*e*) the upper pillar of the ring; and it is plain that (*d*) while it forms the lower pillar of the ring, is at the ſame time the Ligament of the thigh. (*f*) Marks the Spermatic Cord coming through the opening of the ring; (*g*) marks the femoral Artery coming from under Paupart's Ligament, or the Ligament of the thigh. Whence it will be underſtood how Bubonocele or Hernia of the Groin, following the courſe of the Spermatic Cord, will proceed obliquely inwards, and muſt (in attempting to reduce it), be puſhed from within outwards: and how a femoral Hernia will by coming out from under the femoral Ligament, be lodged fairly in the thigh, far from the Groin; lying very deep, apt to be concealed from the Surgeon; and how by following the courſe of the great veſſels of the thigh, the Femoral Hernia will proceed from within obliquely outwards, ſo that, in attempting to reduce this Hernia, we muſt puſh from without obliquely inwards.

PLATE

PLATE IX.

This Plate along with the former explains the Text Book, from page 311, to page 323.

EXPLAINS the ſecond diſſection of the belly; where the muſcles being cut and thrown out upon the thighs, may ſeem irregular and confuſed, though it is truly the natural order and true appearance of the diſſection. The view is not fore-ſhortened enough to make a pleaſant drawing, becauſe it was neceſſary to look from a high point, as in ſeeing a diſſection from the ſeats of a Theatre, in order to have a full view of all the belly, from the Pubis to the Sternum.

1. The EXTERNAL OBLIQUE MUSCLE, (143.) is entirely cut away, and no part of it remains on either ſide.
2. The INTERNAL OBLIQUE MUSCLE (144.) is ſeen on both ſides; on the left ſide of the body it is cut up from its inſertion, and is thrown down upon the thigh, ſhowing chiefly how thick and ſtrong its fleſhy belly is; but on the right ſide of the body it is left in its place, where the obliquity of its fibres is well ſeen, and where the chief points of the deſcription are fulfilled in the drawing, *viz.* that the chief belly of the Obliquus Internus is at the Iliac Spine, that the central fibres only are direct, going acroſs the Abdomen to the Linea Alba; and that the higher fibres

aſcend towards the Sternum, while the lower ones go obliquely downwards to the Pubis. This is the muſcle which gives that muſcular covering of the Spermatic Cord, ſtrong in animals, though weak in man, which is named Cremaſter. The teſticle of the right ſide is torn up from the Scrotum, and thrown out upon the thigh, that the connection of the Spermatic Cord with this the Internal Oblique Muſcle, might be ſeen; and although it could not be diſtinctly expreſſed in ſo ſmall a figure, without exaggerating and departing from the true drawing, yet there is a conical form of the Spermatic Cord at its upper end, which ſhows where the Cremaſter Muſcle joins it.

3. The TRANSVERSALIS ABDOMINIS, (145.) is ſeen on the left ſide. It looks at firſt ſight much like the Internal Oblique, but it is to be remembered, that the Internal Oblique of this ſide (144.) is thrown down over the thigh. The TRANSVERSE ſends all its fibres directly acroſs the Abdomen; and it is ſeen to belong to the inner ſurface of the Thorax, as much as the External Oblique Muſcle belongs to the outer ſurface of it. (*a a*) Repreſent the place where the fleſh of this muſcle ends, and the tendon begins; and the tendon at this point is ſtrongly attached to the tendon of the inner Oblique Muſcle. The letters (*a a*) mark the edge where the two thin tendons adhere to form the ſheath for the RECTUS MUSCLE; the letter (*b*) is placed in the ſheath itſelf; the ſheath is ſeen again on the left ſide empty, and marked (*b b*), with the bowels of the Abdomen ſhinning through the back part of the ſheath, which though very denſe and ſtrong, is yet thin and almoſt tranſparent. But at the lower part (*c*), it is leſs perfect, or rather is wanting; the thinner membrane of the Peritoneum only being found there.

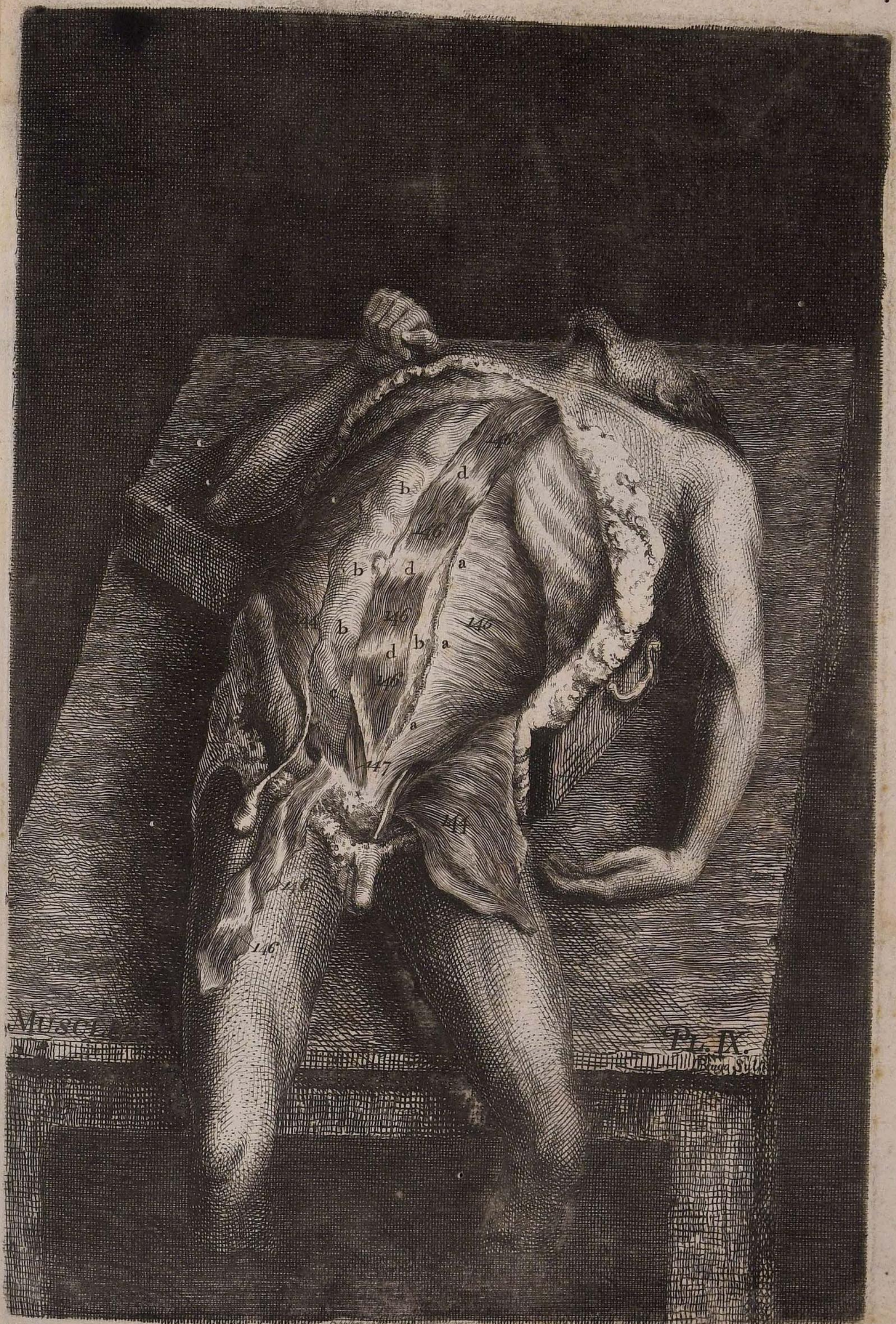
4. The RECTUS ABDOMINIS, (146.) of the left ſide remains in its place; it is diſſected on its fore-part, ſo as to ſhow the tendinous interſections (*d d*), where the fore-part of the ſheath adheres; but at the back of the ſheath, (*i. e.*) at (*b*) there are no ſuch adheſions, and though the Rectus is ſo attached at the fore-part, as to be

very

very difficultly diſſected; it lies at its back part ſo looſely, that it is eaſily turned out of its ſheath with the point of the finger, or the handle of the diſſecting knife.

The Rectus Abdominis of the right ſide, (146.) is thrown down like a ſtrap over the thigh, ſo fully that its tendon by which it is fixed into the Pubis is ſeen, but not very diſtinctly here, becauſe the tendon is ſmall, when the Pyramidal Muſcles are found, as in this ſubject.

The Pyramidal Muscles, (147.) which are as Supplementary Muſcles, are ſeen fully diſſected, with neat, ſmall, and fleſhy bellies, of a very regular Triangular form; the baſe of the Triangle being the origin of the muſcle from the Pubis; the Apex of the Triangle being its inſertion into the Linea Alba, and the mark (*) is put upon the place of the Symphiſis Pubis.



146
d
b
a
140
147
144
Pl. IX.

P L A T E X.

This Plate explains the Text Book, from Page 323, to Page 328.

THIS drawing explains the Diaphragm in a general way; ſhowing how it ſtands, " as a Tranſverſe Partition betwixt the Abdomen and the " Thorax;" and how, by its ſeveral openings, it permits the Veins, Arteries, and great nerves of the Viſcera, to paſs from the one cavity to the other; but ſtill it is repreſented here only in a general way; and though its openings are explained, it is rather with the intention of ſhowing their places, and their relation to each other, than with any intention of deſcribing their particular form; which is more accurately delivered in the next plate.

(1.) Is the upper muſcle of the Diaphragm. This upper and greater muſcle riſes from the inner ſurface of the Thorax; and beſides this origin from the ribs and Sternum, there is alſo another origin, *viz.* from the Ligamentum Arcuatum (*), which ligament is of an arched form, croſſing the roots of the QUADRATUS LUMBORUM, (125.) and of the PSOAS MAGNUS (157.); ſo that the greater or upper muſcle of the Diaphragm riſes from all the border of the Thorax upon its inner ſurface, and from this Ligamentum Arcuatum.

(2.) The LOWER or POSTERIOR MUSCLE of the Diaphragm riſes from the loins by ſmall tendinous heads, which are hidden here by the AORTA (*a*) paſſing over them; but the fleſhy part of this lower muſcle is ſeen with fibres cloſely ſurrounding and embracing the Œſophagus.

(3.) The MIDDLE TENDON is ſeen, but I do not enter upon the detail, nor pretend to repreſent the croſſing of the Tendinous Fibres in this general drawing.

Thus is the Diaphragm, compoſed of one great and circular muſcle before, of one ſmaller circular muſcle behind, and of the triangular tendon betwixt them; and, both in its fleſhy and tendinous parts, it is perforated by ſeveral veſſels, paſſing reciprocally between the Thorax and the Abdomen.

Firſt, (*a*) the AORTA, the great artery of the trunk, paſſes betwixt the Crura, or legs of the Diaphragm, which like an arch ſtrides over it to defend it from preſſure.

Secondly, The ŒSOPHAGUS (*b*), which paſſes through the Diaphragm, a little above the Aorta, and a little towards the left ſide. Its paſſage is by the hole (*b*) through the lower fleſhy belly, and through the moſt fleſhy part of the Diaphragm, and the muſcular fibres of the Crura Diaphragmatis firſt croſs under the hole for the Œſophagus. They ſurround it, then croſs again above the hole, ſo that they form the figure of 8; and the Œſophagus is ſo apparently compaſſed by theſe ſurrounding fibres, that ſome anatomiſts have reckoned this a ſort of Sphincter for the upper orifice of the ſtomach.

Thirdly, The GREAT VENA CAVA; (*c*) (both that branch of the Great Vena Cava, which belongs to the Liver, and that alſo, which comes from the lower extremity) goes up to the right ſide of the heart, through the right ſide of the Diaphragm by the hole (*c*), where a part of this great vein is ſeen hanging down with a flaccid and open mouth; and this hole (*c*), being of a triangular form, paſſing in the hard tendon, and being larger than the vein requires, there is no danger of the vein being ſtrangulated.

(*d*) Is the Left Kidney.

(*e*) Is the Cellular Subſtance in the loins, in which the right kidney lies, the kidney of that ſide being torn away.

(*f*) Is the Bifurcation of the Aorta a little above the top of the Sacrum, and (*g*) the two Iliac arteries.

(159.) Is the Iliacus Internus Muscle, and (*h*) ſhows the manner in which the Iliacus Internus, Pſoas Magnus, and Femoral Artery, come out from under the Femoral Ligament.

The anatomy of the Diaphragm is continued in the next plate.

PLATE

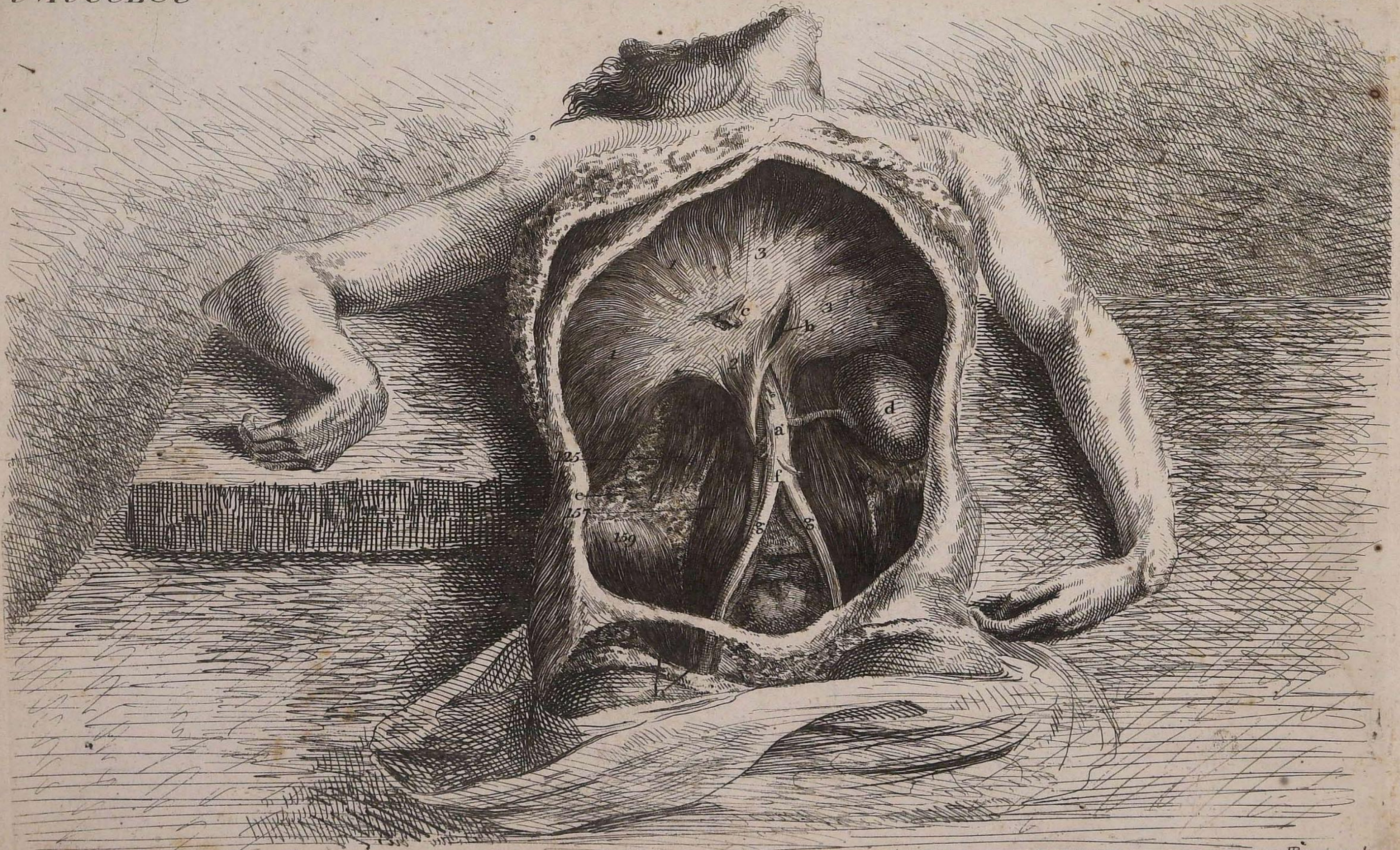


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PLATE XI.

This Plate explains the Text Book, from Page 325, to Page 335.

THIS plate conſiſts of plans of the Diaphragm, and Parts of Generation.

The firſt figure is a drawing of the Diaphragm, neatly diſſected and taken out of the body; explaining all its origins, and all its holes more correctly than plate x.

The ſecond figure is rather a plan than a drawing, and may be very uſeful to the young anatomiſt, in giving him correct notions of the general form of the Diaphragm, how it ſtands ſlaunting upon the whole; convex towards the cheſt, concave towards the belly, and moving (as it may eaſily be conceived by this drawing,) ſo as to perform reſpiration, and all the leſſer functions that depend upon it.

And the third figure explains the muſcles which belong to the parts of Generation. This is by no means a plan merely, as might be conceived from the formal ſhapes of theſe muſcles, but a true drawing after ſeveral careful diſſections, where, though the parts ſeem formal, they are really natural, not exaggerated nor caricatured, but delivered fairly and honeſtly as they muſt always be ſeen after a right diſſection. And they are expoſed in ſuch a poſture, as by its correſpondence with that

for Lithotomy will at once convey a leſſon of ſurgery, while it gives correct and true ideas of theſe parts.

FIGURE I.

DRAWING OF THE DIAPHRAGM.

The parts pointed out along with the Diaphragm marked (145.) are parts of the Tranſverſe muſcles of the Abdomen, which, being internal muſcles and riſing from the inner ſurface of the Thorax, have their tongue-like origins (*a a a*), which come from the ribs, mixed confuſedly with (*b b b*), the tongue-like origins of the great muſcle of the Diaphragm, which tongue-like origins (*b b*) come from the ſame ribs; and it was from this connection with the two Tranſverſe Muſcles of the Abdomen, that the Diaphragm was once reckoned a Trigaſtric Muſcle; *Vid.* Book of the Muſcles, page 315.

(1.) The greater, or upper muſcle of the Diaphragm, has theſe five origins; on both ſides (*d d d d*) mark the fleſh which riſes from the ribs, from the inner ſurface of the Thorax, indigitated with the origins of the Tranſverſe Muſcle; (*e e*) mark the two backmoſt portions of the great Anterior Muſcle, and theſe two portions riſe from the two Ligamenta Arcuata, which ſtretch over the origins of the QUADRATUS LUMBORUM and PSOAS Muſcles. And (*f*) marks a fifth portion of the greater muſcle, which riſes from the inner ſurface of the Sternum and Xiphoid Cartilage.

(2.) The leſſer muſcle riſes by four tendinous feet from the fore-part of the Lumbar Vertebræ; and theſe, the CRURA DIAPHRAGMATIS (*g g*), which ſurround the trunk of the Aorta, and their tendinous feet (*h h h*) are very fairly repreſented here, for they are not nicely cut and pared into diſtinct feet, but are repreſented as they are taken up from the face of the Lumbar Vertebræ; that is, not in the ſhape of

 four

four diſtinct tendons, but adhering to each other in the form of a ſort of denſe tendinous membrane, very white and gliſtening; forming a ſort of ſheath over the fore-parts of the Vertebræ; having flat ſtrings, which are thicker and ſtronger, and more brilliant than the others; but not to be ſeparated (without violence), into the ſhapes of diſtinct feet.

The tendinous feet of the Diaphragm (*h h*), unite into the Crura at (*g g*), and the two Crura, growing gradually more fleſhy, form at (*i i*) the Poſterior Muſcle of the Diaphragm; and it is here, that the fibres of this poſterior or leſſer muſcle croſs and mix, and ſurround the hole for the Œſophagus, with thoſe fibres, which by their croſſing, deſcribe irregularly the figure of eight; and by their compreſſing the Œſophagus form a ſort of Sphincter.

(3.) The Central Tendon is compoſed of fibres, "which come from the vari-" ous Faſciculi of this muſcle, and meet and croſs each other with a confuſed in-" ter-lacement which Albinus has been at much pains to trace, but which Haller de-" ſcribes much more ſenſibly, as Intricationes variæ, et vix dicendæ; irregular and " confuſed croſſing chiefly at the openings, and eſpecially at the Vena Cava, the " triangular form of which ſeems to be guarded in a moſt particular way." *Vid.* book, page 327. And the figure (3, 3.) is repeated upon the ſurface of the tendon, to ſhow the various Faſciculæ of the tendinous fibres, which are truely "variæ et " vix dicendæ," and which it were not only difficult, but uſeleſs to deſcribe.

(*k*) Is the Aorta, where it comes out from the Thorax into the Abdomen; it is here flaccid, and uninjected. Its firſt branches, *viz.* the Cæliac, and upper Meſenteric Arteries are ſeen going off at this point. It was drawn aſide to ſhow the hole through which it paſſes, and was fixed ſo by a pin.

(*l*) Is the hole, by which the Œſophagus paſſes, left empty.

(*m*) Is the hole, by which the Vena Cava paſſes through the tendinous center of the Diaphragm.

FIGURE II.

In this FIGURE, the Diaphragm is drawn in a new poſture; for the trunk (*viz.* the Pelvis and Thorax, with the intermediate Vertebræ of the loins) is ſet almoſt upright. And firſt, the Convexity of the Diaphragm, towards the Thorax (*a*), ſhould be obſerved. Secondly, the obliquity of the Diaphragm ſhould be obſerved; its greater muſcle riſing from all the borders of the Thorax, as at (*b b*), while its Crura and tendinous feet riſe near the top of the Pelvis, from the loweſt Vertebra of the loins. Thirdly, the true appearance of the tendinous feet is marked, the longeſt lying in the middle, and the ſhorter ones being more to the ſide; ſo that (*c*), the longeſt one, lies fair upon the fore-part of the Vertebra of the loins, and riſes almoſt from the loweſt Vertebra; while the ſhorteſt one (*d*) riſes from the Tranſverſe Proceſs or the fourth Vertebra of the loins.

FIGURE III.

The third figure of this plate explains the muſcles of the parts of generation, the hips and thighs being preſented as in the operation of Lithotomy.

For the full explanation of theſe muſcles, the ſtudent muſt turn to the Book of the Muſcles, chapter vii. page 329. where he will find that,

(1.) The ERECTOR PENIS (150.) is a delicate and ſlender muſcle about two inches in length, riſing from the Tuberoſity of the Os Iſchium (*a*); lying along the root of the CRUS PENIS, where it is ſmalleſt; inſerted into the Crus Penis; being very ſmall, and almoſt pointed both at its origin, and at its inſertion *.

(2.) The

* Haller will not allow this muſcle the name of Erector; he ſays it does not draw the Penis back to the Pubis, but that its office rather is to depreſs the Penis, and hold it down to the proper angle, for

(2.) The TRANSVERSALIS PERINÆI, (151.) riſes along with the Erector; from the Tuber Iſchii (*a*), it croſſes the deep hollow which is betwixt the Iſchium and the Anus; and is fixed into the backmoſt point of the bulb of the Urethra.

(3.) The ACCELERATOR URINÆ, (152.) is a double muſcle; or a pair of muſcles one lying upon each ſide of the bulb of the Urethra, ſo that the whole fairly ſurrounds the bulb. And indeed this tumor of the bulb ſeems chiefly formed to favour the action of the Accelerator Muſcle; and the two ſlender and horn-like tendons of the Accelerator are ſeen plainly turning off from the cavernous body of the Urethra (*b*) to go out upon the cavernous body of the Crus Penis (*c*), by which hold it plays more powerfully upon the bulb. We feel the actions of this muſcle very plainly in the throwing out of the laſt drops of urine, as well as in the ejaculation of the Semen; and its great power of throwing the Semen to a diſtance has been aſcertained by experiments, ſuch as ſhould not be repeated. nor mentioned, indeed, except in that language in which they were told. "Conſtat enim per experimenta, ob turpitudinem "non repetenda, multo longius ſemen de ſano et dudum caſto homine proſelire "quam abeſt uterus." The SPHINCTER ANI (153.), is ſeen ſurrounding the opening of the Anus.

Wounds of theſe muſcles are attended with no degree of danger, nor followed by any kind of incapacity, but yet it is very manifeſt, that ſince the inciſions for Lithotomy ſhould be made in one regular and uniform line, theſe muſcles will be cut by every dextrous operator in one certain way; and the naming them wrong muſt be a mark either of ignorance of theſe parts, or at the leaſt, of a bad irregular operation. Now, as the aim of the Lithotomiſt is to get into the bladder by that great hollow which lies betwixt the Tuberoſity of the Os Iſchium (*a*), and the Anus (*d*); the inciſion muſt paſs exactly in the middle betwixt the Tuber and the Anus.

for entering the Vagina. What a pity it is that the illuſtrious author had not aſcertained this curious angle! for we ſhould naturally conceive, at leaſt from what we ſee after our injections, that the Penis when in full erection, ſtood up to the Pubis as cloſe as it could lie.

Anus. The Tranſverſalis Perinæi muſt be fairly cut acroſs; the Accelerator will be ſpared; the Erector cannot be cut; and the operator who cuts the Accelerator, keeps his knife too near the Anus, and wounds the bulb. The operator who ſpeaks of cutting the Erector, either muſt be very ignorant of this ſame Erector, or muſt intend to cut upon the Tuberoſity of the Iſchium, hoping perhaps to cut through the bone: But what ſhall we think of a ſurgeon, who ſpeaks about things of this kind ſo looſely, as to talk of cutting both the Erector and the Accelerator Muſcle; that is of cutting both that muſcle which lies on the outſide of the common inciſion, and alſo that one which lies on the inſide of the common inciſion? After reading this in any author, one might be inclined to turn backwards a page or two, to ſee whether he made an inciſion like that of Celſus; *viz.* in the ſhape of a half-moon.

PLATE

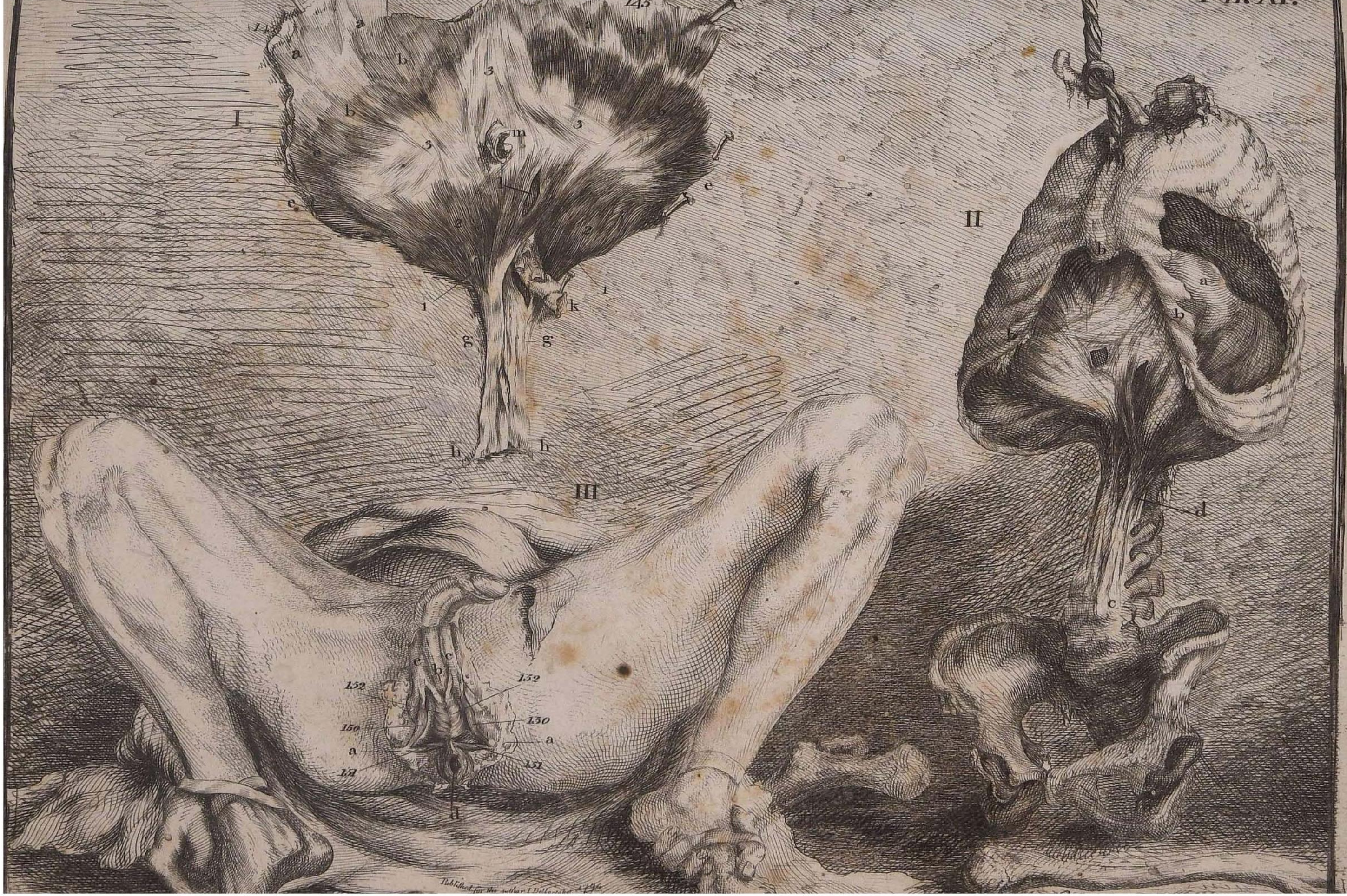

I
II
III

PLATE XII.

This Plate and the next explain the Text Book, from Page 336, *to Page* 384.

OF THE LOWER EXTREMITY.

IN this plate are explained the chief muſcles of the Thigh, Leg, and Foot. The limb is hung by a rope, the foot ſwinging in the air, the ball of the great toe touching the ground. The leg is preſented twice. In a fore view ſhewing the great faſcia of the thigh diſſected back, and the muſcles naked, Fig. i. And again, in a back view, Fig. ii. ſhewing the cavity of the Pelvis; the hollow betwixt the Ham-ſtring muſcles, and the bellies of the Gaſtrocnæmii with the great Achilles Tendon. The explanations cannot be orderly, and therefore they ſhould be ſhort.

In FIGURE I. (*a*) marks the Spine of the Ilium; (*b*) the creſt of the Pubis; (*c*) the ligament of Paupart which runs betwixt theſe two points; (*d*) the Femoral artery paſſing under the ligament. The muſcles which appear on the fore-part of the thigh are theſe.

The RECTUS (171.) lying in the middle of the thigh, having a white and tendinous part in the center, and the fleſhy fibres going in towards it.

The

The VASTUS EXTERNUS (173.) making all the flesh on the the outside of the thigh.

The VASTUS INTERNUS (174.) making that cushion of flesh, which is so prominent upon the inner side of the knee joint, and which makes so particular a mark in the drawings of the thigh: and all these three muscles, viz. the Rectus, Vastus Externus, and Vastus Internus, are inserted together into the Patella, which is marked (*e*).

Then the SARTORIUS (175.) is seen rising from the highest point of the Os Ilium; crossing the thigh, long and slender like a strap, and bending down the Vastus Internus Muscle.

The head of the Gracilis (176.) where it rises from the Pubis is here seen;—next to that is seen the first head of the TRICEPS (161.); and next to that the PECTINALIS (160.) with the artery of the thigh lying flat upon its belly.

These are the chief muscles on the fore part of the thigh; they are naturally covered with the FASCIA, or broad tendinous expansion, marked (*f*), and the FASCIALIS MUSCLE, which, from its making this vagina tense, is named Tensor Vaginæ Femoris; is marked with its appropriated number (156.), and is drawn out along with the fascia, and is seen rising from the same point of the Os Ilium, from which the Sartorius rises.

In the LEG, (*g*) marks the Tibia; and the muscles are,

The GASTROCNÆMIUS, (181.)

The TIBIALIS ANTICUS (187.), which comes from the fore part of the Tibia, crosses the ancle obliquely, goes over the side of the foot to be implanted into the root of the great toe; and this is the tendon which makes that sharp angle on the fore-part of the ancle where the buckle lies.

The EXTENSOR POLLICIS (196.) lies next to the Tibialis, and its tendon passes like that of the Tibialis Anticus under the Annular Ligament of the ancle, which is marked (*h*); and next to the Extensor Pollicis lies the EXTENSOR LONGUS DIGITORUM PEDIS (193.) which lies deeper still, and more towards the outside of the leg. Its tendons are seen going out to each of the toes, and these tendons are accompanied with the

tendons of the little mufcle the EXTENSOR BREVIS DIGITORUM PEDIS (195.), which is feen lying under the tendons of the long mufcle.

Behind the Extenfor Digitorum, and hiding it in part, is the PERONEUS LONGUS Mufcle (184.), which belongs to the brawn of the Leg, and the tendon of which paffes down behind the outer ancle.

In the foot, Fig. II. lying under this one, is explained the Plantar Aponeurofis, or that fafcia which belongs to the fole of the foot; and which is defcribed in the Book of Mufcles, page 382. It is feen here to confift of three general divifions, the middle one (*i*), the lateral one (*k*) on the outfide, which covers the Flexor, and the Abductor Minimi Digiti; and the lateral one (*l*) on the infide, which covers the Flexor and the Abductor Pollicis.

The general Fafcia where it covers the thigh is marked (*f*), but it is merely a continuation of the fame fafcia that covers the leg; and where it covers the leg it is marked (*); and it is ftill the fame fafcia which being continued over the fore-part of the foot, is there ftrengthened by its adhefion to the outer and inner ancles, by which, taking a new form it becomes the Annular Ligament, fo that the Annular Ligament is merely a ftrengthening of the common fafcia.

FIGURE III.

THIS view fhows chiefly the mufcles upon the back part of the thigh and leg. The Vertical Section of the Os Sacrum is marked (*m*); the hollow of the Pelvis is marked (*n*); the Vertical Section of the Os Pubis is marked (*o*); and the letter (*p*) is put down upon the Tuberofity of the Os Ifchium, which could not be clearly marked. And the mufcles are,

The PSOAS MAGNUS (157.); croffing the brim of the Pelvis, to go down into the thigh.

The GRACILIS (176.), which is feen coming from the arch of the Pubis, and going down to be inferted by a delicate and flender tendon, into the head of the Tibia.

The firſt and ſecond heads of the TRICEPS, (161.) are ſeen from behind.

The SEMI-MEMBRANOSUS (178.) is next ſeen; but the whole of it is not ſeen; nothing is bare here but the middle and lower parts of the muſcle; but there is enough of it to ſhow that it is not as its name imports, a muſcle having a membranous appearance, it has on the contrary a very thick fleſhy belly.

The SEMI-TENDINOSUS (177.) is next to it, and the reaſon of its being named Semi-tendinoſus is ſeen in the length of its tendon (*q*). The Semi-membranoſus and the Semi-tendinoſus form together the inner ham-ſtring. The outer ham-ſtring is formed by the Tendon of the Biceps Cruris Muſcle; and the belly of the Biceps (180.) is ſeen held out by three ſticks, ſo as to ſhow the deep hollow betwixt the ham-ſtrings, in which is ſeen hanging the great SACRO-SCIATIC NERVE (*r*); where it is going down the back of the thigh, to paſs down under the heads of the Gaſtrocnemii Muſcles.

The GREAT GLUTÆUS MUSCLE (163.) is ſeen upon the hip diſſected, ſo as to ſhow the order of its fibres, and hanging like the reſt of the leg all looſe and flaccid.

The VASTUS INTERNUS (174.) is alſo ſeen making a fleſhy belly juſt over the knee-joint.

The two bellies of the GASTROCNEMIUS MUSCLE (181.) are ſeen riſing each from its own Condyle of the thigh bone at (*s s*), and meeting together to be joined into the great Achillis tendon (*t*); which grows gradually ſmaller as it goes downwards to be implanted into the heel at (*u*), where ſtill it is very thick and ſtrong.

The great belly and tendon of the FLEXOR POLLICIS (188.) is alſo ſeen paſſing behind the inner ancle.

A part of the belly of the SOLÆUS (182.) is ſeen lying under the belly of the Gaſtrocnemius.

The foot in this drawing, is left covered with ſkin, and puffed, and ill ſhaped, as it naturally is, while under diſſection.

PLATE

MUSCLES PL: XII.

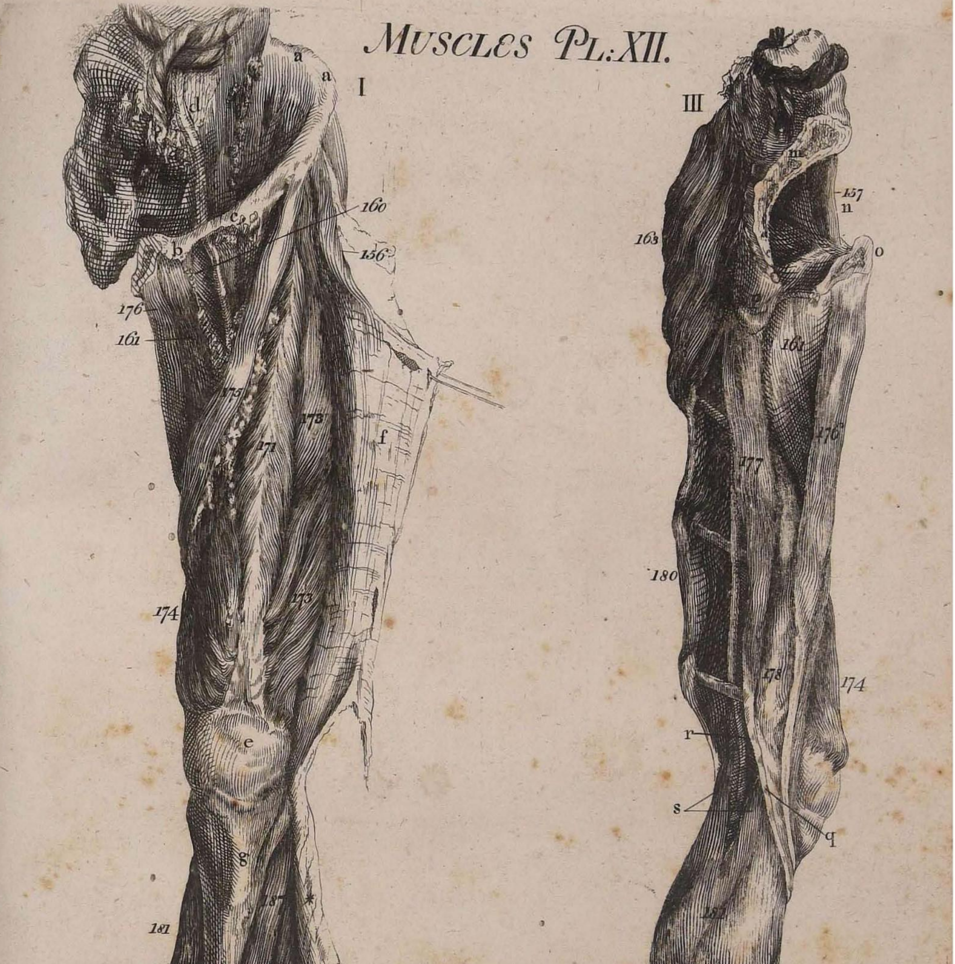


PLATE XIII.

This Plate explains the Text Book, from Page 336, to Page 384.

SHOWS the deeper muſcles of the THIGH, LEG, and FOOT, alſo in two drawings; one repreſenting the fore, and the other the back-parts of the leg. This is a fuller diſſection than the laſt, ſo that it differs greatly in general appearance from the laſt drawing, but ſtill the general poſition is exactly the ſame.

In FIGURE I. are ſeen,

The GLUTÆUS MAXIMUS (163.) now diſſected, and cut away from its origin in the haunch bone, left at its inſertion into the thigh bone. It is hung out by a ſtring, and the ſhape, which it falls into, ſhows that it is one of the heavieſt and fleſhieſt muſcles in the body; a part of the Glutæus Medius (164.) is ſeen under it.

The RECTUS FEMORIS (171.) is now cut away, and nothing of it is left here, but its origin from the Spinous Proceſs marked (*a*); and its inſertion into the Patella, which is marked (*b*) is thrown down and left hanging. By the throwing down of the RECTUS FEMORIS, the great maſs of the CRURÆUS (172.) which lies under it is expoſed, and it is ſeen that the Cruræus conſiſts partly of tendon, partly of fleſh, extends all along the thigh, riſes from the thigh bone, lies immediately under the Rectus, and is inſerted along with it into the Patella; and here the VASTUS EXTER-

NUS (173.) is feen in its place. The VASTUS INTERNUS (174.) is cut and thrown down, and left hanging over the knee like the Rectus.

The SARTORIUS (175.) is alfo cut away from the Ilium, and left hanging down along the leg.

The FASCIALIS (156.) is feen here alfo with a rag of its fafcia connected with it.

The PSOAS MAGNUS (157.) which comes from the fides of the Lumbar Vertebræ, and the ILIACUS INTERNUS (159.) which comes from the infide of the haunch bone, are feen turning over the fore-part of the Pelvis together to go down through among the flefh of the thigh, to the leffer or inner Trochanter of the thigh bone.

The PECTINALIS (160.) is feen rifing from the Pubis, and ftretching flat and direct towards the thigh bone.

The TRICEPS LONGUS marked (1.), as it is the firft head of the Triceps Femoris, (161.) is feen here thick, and flefhy. This covers the other two heads of the Triceps, *viz.* the Triceps Brevis, and Triceps Magnus; the edge of the TRICEPS MAGNUS, or third head of the Triceps, is feen here, (3.); but the TRICEPS BREVIS or fecond head of the Triceps is here entirely covered by the Pectinalis and Triceps Longus, and is feen only in the fecond drawing, where it is marked (2.)

The mufcles on the back-parts of the hip and thigh, are explained in figures ii. and iii.

In FIGURE II. we have the GLUTÆUS MAXIMUS (163.) hung out by a ftring as in the other drawing. The PSOAS MAGNUS (157.) croffing the brim of the Pelvis as in the former drawings; the Triceps Longus marked (1.) defcending from the Pubis, to the middle of the thigh bone; behind that is feen the Triceps Brevis, vel fecundus, (2.) the fecond head of the Triceps, which is held as a part of the fame mufcle, though it lies behind the firft, and is of a different layer; and behind that ftill lies the TRICEPS Magnus (3.), which has alfo very little connection with the other heads, but it is called the third head of the Triceps; and there is feen the Femoral Artery marked (*c*) paffing through the Triceps Magnus from the fore to the back part of the thigh; the artery is marked (*c*), and the tendon of the Triceps Magnus, where it is implant-

ed

ed into the inner Condyle of the thigh bone, is marked (*d*); ſo that the artery paſſes through the Triceps from the fore to the back part of the thigh, only a little above the knee.

The root of the Semi-membranoſus (178.) is ſeen at (*e*), where it riſes by a thick and fleſhy head from the Tuberoſity of the Os Iſchium; the lower end of it where it is attached to the head of the Tibia is cut, and hangs down at (*f*).

The oppoſite Ham-ſtring Muſcle the Biceps (180.) is ſeen; its bellies are marked with the proper number of the muſcle. Its longer head is ſeen riſing in common with the Semi-membranoſus from the Tuberoſity of the Os Iſchium at (*g*); the longer head is marked (*g*), but the ſhorter head of the Biceps which riſes from the back of the thigh bone, is marked (*h*); the place where the long and the ſhort heads of the Biceps Femoris unite and mix their fibres is marked (*i*); and the tendon of the Biceps which forms the outer ham-ſtring is marked (*k*).

All the ham, or the back part of the knee-joint, is now expoſed by the throwing down of the conjoined muſcles, the GASTROCNEMIUS EXTERNUS (181.) and the SOLÆUS, (182.) which are left only at their inſertion by the great Achillis Tendon (*l*), which is fixed into the heel bone; and the Gaſtrocnemius and Solæus being thus thrown down, the two curious muſcles which lie in the ham are expoſed, *viz.* the PLANTARIS (183.) which riſes from the outer Condyle of the Os Femoris, has a very ſmall delicate fleſhy belly, like that of the PALMARIS LONGUS. It has alſo a ſmall round tendon like it, the ſmalleſt and longeſt in the body, not groſſer than a fiddle-ſtring; which going down along the inner ſurface of the Gaſtrocnæmius, and making an impreſſion upon the inner ſurface of the great Achillis Tendon, accompanies it to the heel, where it is implanted along with it.

The other ſmall muſcle is the proper muſcle of the ham, which is thence named MUSCULUS POPLITÆUS (179.) It is a beautiful triangular muſcle, which lies exactly upon the back part of the joint as a ſort of guard to the Capſule, and like a check band for ſupporting the knee. It comes from the outer Condyle along with the

little

little belly of the Plantaris, croſſes the joint with oblique fibres; comes from the Condyle of the thigh bone; is inſerted into the back of the Tibia, and ſo bends the knee.

In the legs of both drawings, the following deep ſeated muſcles are ſeen. In the firſt leg, the deep muſcles of the toes which lie under the Tibialis Anticus, and they are all extenſors of the toes. In the ſecond leg the deep muſcles which lie under the Gaſtrocnemius and Solæus; and they are all flexors of the toes.

In Figure I. is ſeen (*m*), the place upon the fore-part of the Tibia, from which the fleſhy belly of the Tibialis Anticus is cut away; ſo that the next muſcle the Extensor Pollicis (196.) is ſeen, which is a long, penniform, and very ſtrong muſcle; and its long tendon is ſeen going to the great toe.

Behind that again, lies the Extensor Longus Digitorum Pedis (193.), which has its fleſhy belly lying behind the Extenſor Pollicis; and its four tendons are raiſed over one leg of the compaſſes, ſo as to expoſe the ſhort flexor which lies beneath, upon that part of the foot where the buckle reſts; and which is ſeen beginning by a ſmall head (*n*), from the heel bone. Behind the Extenſor Digitorum lies a third muſcle, which is like a ſlip of the Extenſor, but its tendon does not run into the toes. It is fixed into the ſide of the foot at the root of the little toe, it is therefore a bender of the foot, and from its riſing from the Fibula, is named Peroneus Tertius (194.)

And Laſtly, in this figure, a part of the Peroneus Longus (184.) is ſeen, a muſcle which rightly belongs to the other ſide of the leg, and the tendon of which paſſes behind the outer ancle, to go down into the ſole of the foot.

In Figure II. are ſeen, in like manner, all the long flexors of the toes and foot.

Firſt the Tibialis Posticus (186.) begins with a ſtrong fleſhy belly upon the back part of the Tibia; is penniform like moſt of theſe long muſcles of the leg; and ſends a long tendon down behind the inner ancle, which runs in a particular ring of the Ligaments that are behind the ancle; and, getting into the ſole of the foot, is fixed by many ſpreading roots into the ſeveral bones of the Tarſus.

The

The FLEXOR LONGUS DIGITORUM PEDIS (189.) lies immediately behind this; is like it in all points; ſends its long ſlender tendon down alſo behind the ancle in its own peculiar ring, but, paſſing the bones of the Tarſus, it divides into four tendons, which go to each of the leſſer toes.

The FLEXOR LONGUS POLLICIS PEDIS (188.) is the appropriated muſcle of the great toe. It has a large fleſhy belly, a very ſtrong big tendon, and runs by the inner ancle in its own peculiar ring. Now it is to be noticed, that this Flexor Pollicis, though the flexor only of one ſingle toe, is much bigger than the common flexor of all the toes. It is even bigger than both theſe, or the Tibialis Poſticus, which is the great muſcle of the foot. The meaning of which is very plain; *viz.* that theſe muſcles of the toes are to be conſidered not ſo much as mere benders of the toes; for when we obſerve how little the toes move, and how much walking conſiſts in riſing upon the ball of the great toe, we ſhall regard theſe muſcles rather as benders of the whole foot. It is by the power of theſe muſcles, that we beat the ground in each ſtep in walking, for in walking each puſh in carrying the body is made by the preſſing of the ball of the great toe againſt the ground; and theſe muſcles all preſs down the ball of the great toe. In making the ſtep, theſe flexor muſcles of the toe, and foot, are chiefly aſſiſted by a muſcle belonging to the other ſide of the leg, I mean the PERONEUS LONGUS (184.), which riſes not like theſe, from the back of the Tibia, to paſs behind the inner ancle, but from the whole length of the Fibula, whence its name of Peroneus, and paſſes down in a ring behind the outer ancle; and this ſtrong tendon which makes the ſharpneſs behind the outer ancle, and gives ſhape to the leg, is here drawn out with a ſtring juſt where it is deſcending into its ſheath or ring.

Thus all the muſcles which bend the foot, and ſo raiſe the body at each ſtep, are diſtinctly ſeen in this diſſection; *viz.* The GASTROCNEMIUS (181.) the SOLÆUS (182.) and the PLANTARIS (183.); the TIBIALIS POSTICUS (188.) FLEXOR DIGITORUM (189.) FLEXOR POLLICIS (188.) and PERONEUS LONGUS. (184.) There is but one more, the

Peroneus Brevis, which is fo exactly like the Peroneus Longus, that its not being feen in this view, is hardly an imperfection, the demonftration being fufficiently full.

The foot is diffected in Figure iii. where is feen firft the fhort Flexor, the FLEXOR BREVIS DIGITORUM PEDIS (191.), cut up from the heel bone where it has its origin; its flefhy belly is thrown out; its fhort neat tendons are going to each of the toes; its tendons are perforated like thofe of the hand, for the tranfmiffion of the tendons of the long Flexor. The tendons of the long Flexor are marked (*o*); they are feen going forwards to thread the loops, made by the fhort tendons; and there is feen connected with the long Flexor that fhort fupplementary mufcle which comes from the heel bone, and which being irregular in its form, is called the MASSA CARNEA JACOBI SILVII (190.). The Lumbricales are too delicate to be feen in a fmall drawing like this, but they are eafily found in diffection, for they are like a continuation of the Maffa Carnea lying in the forks of the tendons.

The tendon of the long Flexor of the great toe is feen here (*p*), efcaping from under the inner ancle, and appearing upon the fole of the foot; and it is feen to be connected here (by a fmall flip of tendon) with the long Flexor of all the toes. This tendon of the long Flexor of the great toe is feen to pafs betwixt the two heads of the fhort flexor, which is marked with its proper number (191.) The Abductor of the little toe is alfo feen.

There remain to be explained, certain mufcles which immediately furround the hip joint; and which are defcribed in the book from page 347, to 352.

The TROCHANTERS are fo named, becaufe they are placed fo that moft of the mufcles which are implanted into them, at the fame time that they bend the thigh, turn it alfo.

Thefe mufcles are explained by figure iv. The Pelvis is hung up by a rope, put round the Lumbar Vertebræ; and the points of bone to be obferved as explaining the pofture are, (*q*) the line of the Os Sacrum, and Os Coccygis; (*r*) the tuberofity

of the Os Iſchium; (*s*) the Sacro-Sciatic Ligament paſſing from the Sacrum, to the Iſchium; (*t*) the Spine of the Ilium; (*u*) the great Trochanter of the Thigh Bone; and (*v*) the ſhaft of the ſame bone.

And the muſcles that are ſeen are,

FIRST, the GLUTÆUS MEDIUS (164.) cut away from its origin, which is from the Os Ilium at (*x*); the great Glutæus, which riſes from the Sacrum and Ilium, from (*g*) to (*t*) being cut entirely away. The middle Glutæus (164.) is ſeen to be implanted into the very Apex of the Trochanter; the GLUTÆUS MINIMUS (165.) which lies under it, riſes again from that part of the Os Ilium that forms the ſocket for the Thigh Bone; and is of courſe the deepeſt, and the ſmalleſt of theſe muſcles.

Behind the GLUTÆUS MINIMUS is ſeen the PYRIFORMIS (168.); and the reaſon of its name, taken from its Pyramidal form, is well explained; and its broad thin belly is ſeen coming from the hollow of the Sacrum within the Cavity of the Pelvis; and its ſmall flat tendon is ſeen inſerted into the root of the Trochanter Major.

The QUADRATUS FEMORIS, (170.) a ſhort and ſquare muſcle is ſeen coming from the tuberoſity of the Os Iſchium, and implanted into the greater Trochanter.

The muſcles, named Marſupiales, are ſeen going into the Trochanter at the point marked (*y*); and I do not put their right numbers (166.) (167.) upon them, leſt it ſhould confound ſo ſmall a drawing. Beſides, it will be eaſily enough underſtood, that the white tendon, marked (*y*), is the tendon of the Obturator Internus, which comes from within the Pelvis, turning over the tuberoſity of the Os Iſchium; and the little fleſhy ſlips above and below this white tendon, and incloſing it upon either ſide, are the GEMINI MUSCLES (166.) (167.), one above, another below the Obturator Internus, and all the three inſerted together into the root of the Trochanter at the point (*y*). A part of the TRICEPS FEMORIS is marked (161.); the heads of the Biceps, and of the Semi-tendinoſus, and Semi-membranoſus

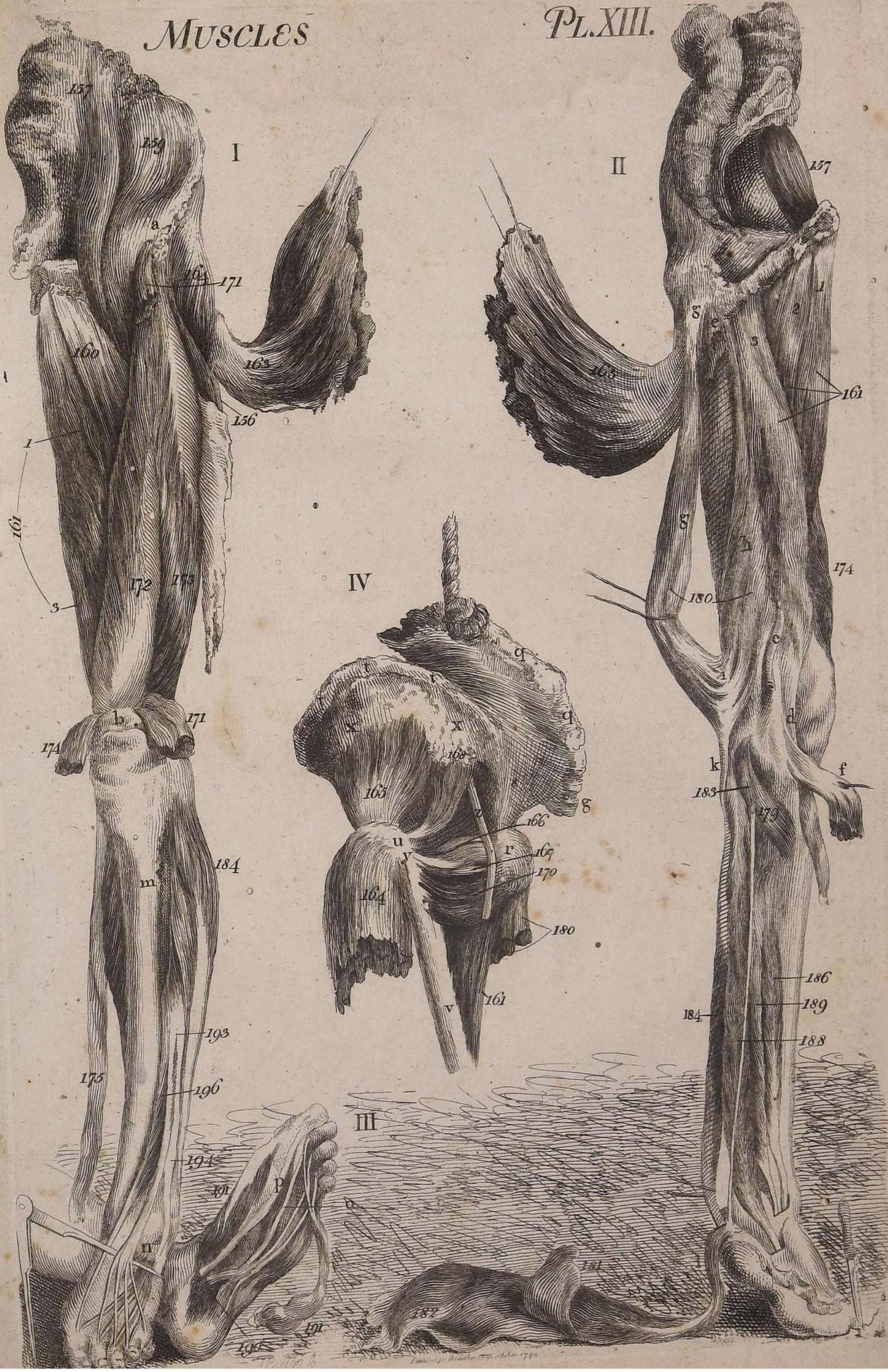
 where

where they all three rife together from the tuberofity of the Os Ifchium, have the mark of the Biceps only, which is (180.)

The SACRO-SCIATIC NERVE, where it comes out from the cavity of the Pelvis, along with the Pyriform Mufcle, is marked (z).

MUSCLES

PL. XIII.



THE

THIRD BOOK.

OF THE

JOINTS.

BOOK THIRD.

OF THE

JOINTS.

IF this book ſeem ſhort, it is becauſe I have omitted many joints, which it is decent and proper for the profeſſed anatomiſt to be acquainted with, but which it were very ſuperfluous to trouble the ſtudent about, for the ſubject is hardly even curious, and certainly not uſeful. Therefore I have made a fuller deſcription of the ſhoulder, knee, and hip; and have refrained from giving any drawings of the joints of the head, of the Vertebræ, or of the ribs; for theſe joints are not eaſily underſtood, are hardly worth remembering, and are very ſoon forgotten. It was natural for me to be afraid leſt the hiſtory and drawings of theſe joints might ſwell the book, making it more expenſive, and leſs uſeful.

PLATE

PLATE I.

This Plate explains the Text Book, from Page 427, to Page 439.

EXPLAINS the Shoulder Joint, Elbow, and Wrift.

FIGURE I.

IS the fhoulder joint which was fet up for this drawing, the whole piece of anatomy refting upon the lower angle of the Scapula, and upon the cut end of the Os Humeri. The marked points by which the mufcles and the joint are explained, are thefe chiefly: (*a*) The Clavicle; the letter (*a*) is placed on the middle of the bone, where it projects in the collar or root of the neck; (*b*) is the end next the Sternum with fome ragged flefh hanging from it; (*c*) is the flat end by which it touches the point of the Acromion Procefs; (*d*) marks the Acromion Procefs where the Clavicle is joined to it; and (*e*) is the point or apex of the Coracoid Procefs. (*f*) Marks that line of the Scapula which is called its bafe, and it, like the Clavicle, has the remains of its ragged mufcle hanging down from it. And laftly, (*g*) is the Os Humeri.

The mufcles which are feen here are,

The SUBSCAPULARIS (77.) covering the whole of the Lower Surface of the Scapula, and better explained than in the fmaller drawings for the mufcles of the arm. A fmall part of the SUPRA-SPINATUS (73.) is alfo feen.

The

The Biceps (78.) is marked in the bellies with its proper number, and its two heads are alſo marked; the ſhorter head (*b*) riſing from the Coracoid Proceſs; and the longer head (*i*), coming down from within the cavity of the joint.

The Coraco-Brachialis (72.), is ſeen hanging down looſe and flaccid, from the Coracoid Proceſs, and paſſing obliquely under the two heads of the Biceps; to be fixed into the arm bone.

The DELTOIDES (71.) is cut away from the Scapula and turned backwards, and it hangs over the arm bone very thick and maſſy. And this white and ſhining appearance upon the inner ſurface of the Deltoides is from the Cellular Subſtance which lies under it being condenſed into ſomewhat of the form of a faſcia. And it is from this faſcia, that one of the great Burſæ Mucoſæ belonging to this joint riſes. The fleſh of the Deltoid is ſeen at (*b*), and the faſcia, covering the face of the muſcle, is marked with the number (71.) And laſtly, the LATISSIMUS DORSI (70.) is ſeen cut off about ſix inches from its inſertion into the ſhoulder bone, and left hanging there. (*kk*) Wherever they are found, denote the fat which lies in the interſtices of the muſcles, and which ſhould not be too curiouſly picked away in any part of a diſſection, unleſs it be neceſſary for making ſome important part very clean and diſtinct.

The parts more immediately belonging to the joint are theſe.

1. The Acromion Proceſs (*d*) overhangs the joint from above, and prevents luxations upwards.
2. The Coracoid Proceſs (*e*) ſtands up on the inſide of the arm, to ſtrengthen the joint in that direction alſo.
3. The LIGAMENTUM PROPRIUM TRIANGULARE SCAPULÆ (*m*) croſſes from the Acromion to the Coracoid Proceſs, makes a ſort of bridge betwixt them, and keeps all firm in that direction.
4. Another ligament is ſeen here, the LIGAMENTUM COMMUNE TRAPEZOIDES (*n*), which does not rightly belong to this joint, being but a ligament of the Clavicle; ſo

ſo that there are the following parts attached to the Coracoid Proceſs (*e*), *viz.* the Coraco-brachialis (72.), and the ſhort head of the biceps (*b*), going down from it, the Ligamentum Triangulare Proprium (*m*) going to the Acromion, and the Ligamentum Commune (*n*) going to the Clavicle.

The Capſule or bag of the joint which is exceedingly thin, and lax, is marked (*o o*); and it is cut open to ſhow the head of the bone, as it lies in its ſocket. This ſhows alſo the long tendon (*i*), of the Coraco-brachialis as it comes through the ſocket, lying upon the round head of the ſhoulder bone. And laſtly, the flat tendon of the Subſcapularis is ſeen ſpreading over the Capſular Ligament at (*p*), by which it will be eaſily conceived, how the other muſcles ſpread over the Capſule to ſtrengthen it; for here it is ſeen, that the cut edge of the Capſule, and the cut edge of the tendon of the Subſcapularis is one and the ſame part; that is, the flat tendon and the Capſule are ſo incorporated, that the one cannot be cut nor torn without the other. And thus it may be underſtood, how the chief ſecurity and ſtrength of the ſhoulder joint is from the muſcles ſurrounding its Capſule ſo cloſely, and being implanted directly into the head of the bone.

FIGURE II.

Is intended chiefly for ſhowing the ſhallowneſs of the Glenoid Cavity, when compared with the head of the bone, and it alſo explains very well the way in which the long tendon of the biceps riſes from the margin of the Glenoid Cavity.

The Scapula (A) is naked, but with the remains of ragged fleſh hanging about it; where (*c*) marks the Spine of the Scapula riſing towards (*d*), which is the point of the Acromion Proceſs; (*e*) marks the apex of the Coracoid Proceſs ſcarcely ſeen; (*m*) is the Ligamentum Proprium Triangulare lying rather in ſhadow; the Capſule is here alſo marked (*o o*); it is cut up and thrown quite back in a ſquare form

form from the manner in which it is cut; the edges of the cut Capſule are ſtill ſeen ſurrounding the ſhoulder bone, as well as the Glenoid Cavity; and this throwing back of the Capſule ſhows the ſhallowneſs of the Glenoid Cavity (*p*), and the roundneſs and largeneſs of the head of the ſhoulder bone; and within the Capſule is ſeen the long head (*i*) of the biceps, riſing from the margin of the ſocket, at its upper part. (*k*) Marks the remains of the tendon of the Supra-ſpinatus Muſcle, where it lies upon the Capſule and adheres to it; and it is this tendon which gives the Capſule an appearance of thickneſs, and makes it turn ſo rigidly backwards at this particular point (*k*).

FIGURE III.

MAY be compared with figure i. to obſerve how entirely the joint is ſurrounded with its great muſcles: For here is the Infra-ſpinatus covering the Capſule, juſt as the Subſcapularis does in figure i. But the chief uſe of this figure is to give a true notion of one of the greateſt Burſæ Mucoſæ that belong to the ſhoulder joint.

The Parts marked in this drawing are,

The baſis of the Scapula (*a*); the beginning of the Spine of the Scapula (*b*); the Acromion Proceſs (*c*); the Clavicle (*d*); the ligament which ties the outer end of the clavicle firmly to the point of the Acromion Proceſs (*e*); the point or apex of the Coracoid Proceſs (*f*); the ſhaft of the ſhoulder bone (*g*). But the head of the ſhoulder bone is concealed by the muſcles, and other ſoft parts.

Then, of the ſoft parts there are ſeen chiefly theſe, The great belly of the INFRA-SPINATUS Muſcle (74.), where it lies upon the Scapula black and ſhining; (for every muſcle when diſſected clean, has a metally-like ſurface);—the belly of the TERES MINOR (75.), the tendon of which twiſts to be implanted thus into the ſhoulder bone at (*k*).

The ſhort head of the biceps (*h*) is ſeen riſing from the point of the Coracoid Proceſs

(*f*); while its longer head (*i*) is ſeen coming out round and ſmall from the cavity of the joint: The fleſh of the CORACO-BRACHIALIS (72.) is ſeen black, and lying in ſhadow behind the two heads of the biceps. The two heads of the biceps are not joined to each other till they paſs the middle of the arm, *i. e.* below the point where (78.) the number of the biceps is placed.

Laſtly, The chief point in this drawing is the Burſa Mucoſa marked (*m*); which lies on the outſide of the Capſular Ligament of the joint; it is very large, and is ſurrounded by many ſmaller ones. This is ſufficient to explain the appearance of a Burſa Mucoſa; the uſe of this great one, lying betwixt the Capſule of the joint and the Acromion Proceſs is eaſily conceived, and the nature of the ſmaller ones lying under the point of the Coracoid Proceſs, and under each of the tendons, as of the Teres Major, Latiſſimus Dorſi, &c. need hardly be explained *.

FIGURE IV.

EXPLAINS the Elbow-joint; and alſo ſhows the Wriſt, but imperfectly.

The three bones which form the Elbow-joint are, the Humerus (*a*); the Radius (*b*); and the Ulna (*c*). They are all connected with each other by the general Capſule or bag of the joint (*d*), which is derived from the Perioſteum, coming off from the ſhoulder bone above thoſe hollows which receive the Olecranon and Coronoid Proceſſes; which is in itſelf thin, and delicate, but is croſſed by lateral and Tranſverſe Ligaments, ſo that it does not appear like a diſtinct bag; and therefore the chief demonſtration is of the bands, which go acroſs the Capſular Ligament to ſtrengthen it in various directions.

1. The CORONARY LIGAMENT of the Radius is not, as might be ſuppoſed, any diſtinct ligament, but merely a particular form of that part of the General Capſule.

The

* This is the Burſa which I had ſeen diſtended with a prodigious quantity of glairy fluid, and producing a tumor upon the ſhoulder. *Vid.* Book upon the Joints, page 431.

The Coronary Ligament (*e*) is juſt that part of the General Capſule, which belongs to the head of the Radius. In attaching itſelf to the neck of the Radius, it ſeems a little radiated or purſed up at the root (*d*); a little higher as at (*e*), where it goes over the plain button-like head of the Radius, it is braced very firm; it is indeed hard and cartilaginous, particularly hard and ſmooth within; and at this point, it is eſpecially ſtrengthened by two Acceſſory Ligaments; the one (*m*), named the ANTERIOR ACCESSORY LIGAMENT, is hardly to be diſtinguiſhed from the fore-part of the General Capſule, which is irregular and very lax. This Acceſſory Ligament is almoſt mixed with the lower part of the Capſular Ligament; being in fact but a ſtronger band of the general Capſule, the Capſule being ſtretched over the point of the Coronoid Proceſs of the Ulna. But there is another ſtrengthening of the Capſule, which forms a more diſtinct and ſtronger Acceſſory Ligament for the Coronary Ligament of the Radius: This Acceſſory ring of Ligament is marked (*n*), and riſes from the ſharp edge of the Coronary Proceſs of the Ulna.

And laſtly, the two INTERNAL LATERAL LIGAMENTS, or the ſtrengthenings of the Capſule by ſlips of Ligament, which come from the Condyle are marked (*o o*). There are generally two as here repreſented; but ſometimes they are united into one larger Ligament. Theſe two ſmall but ſtrong ſlips of ligament go from the inner Condyle of the Os Humeri to the root of the Coronoid Proceſs, where it riſes from the body of the Ulna.

The INTER-OSSEUS LIGAMENT, which paſſes betwixt the Radius and Ulna, is marked (*p*); its ſtringy fibres are ſeen, and alſo the holes by which arteries and veins paſs from the fore to the back parts of the fore arm. One particular ſlip of ligament marked (*q*), is named CHORDA TRANSVERSALIS CUBITI; and is always found of this form, ſtretching from the Radius below its Tubercle, to the Coronoid Proceſs of the Ulna.

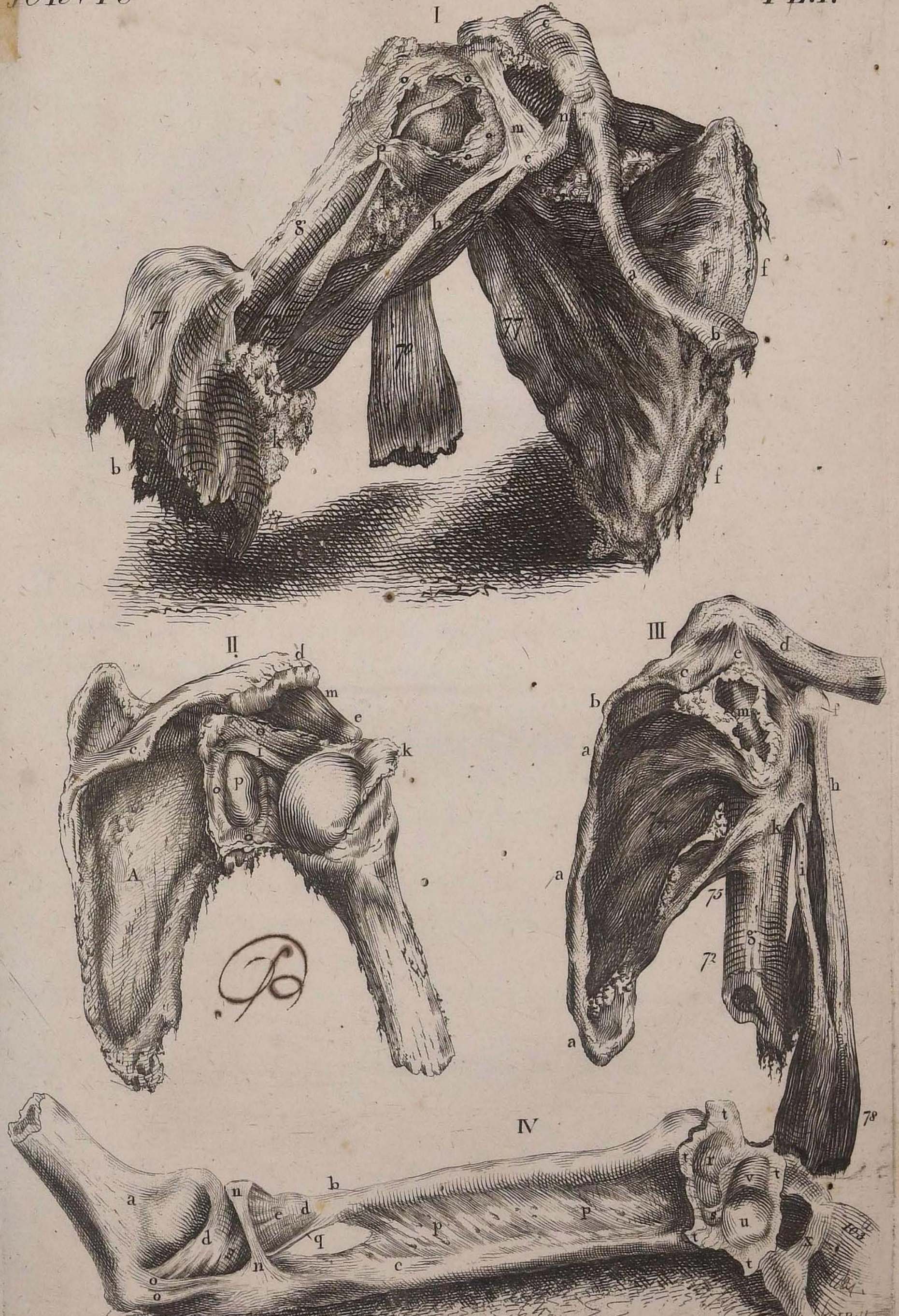
In the lower part of the ſame drawing, we have the wriſt-joint, where (*r*) marks the

Scaphoid

Scaphoid Cavity of the Radius (*s*). The moveable Cartilage, ſmall and Triangular, which repreſents the head of the Ulna in this joint (*t*), points out the oval form of this cavity by circumſcribing it; (*u*) ſhows the round head of the Os SCAPHOIDES; (*v*) ſhows a ſimilar round Articulating Surface of the Os LUNARE; and it is here ſeen, that theſe two are the chief bones on the part of the Carpus, and that they form together an oval head, which, correſponding with the oval form of the Scaphoid Cavity of the Radius (*r*), makes the wriſt-joint a regular hinge, not capable of lateral motions.

The Capſule of the wriſt which incloſes theſe bones, to form them into a joint, is ſeen here with its cut edges marked (*t*); for the lines from (*t*) ſerve at once to circumſcribe the joint, explaining its oval form, and to mark the cut edges of its Capſule. (*x*) Marks the croſs Ligament of the wriſt which binds the tendons down into the deep hollow, which is repreſented here; and (103.) marks the Abductor Pollicis.

PLATE



Published for the author J. Bell october 1794

PLATE II.

This Plate explains the Text Book, from Page 239, to Page 452.

THE two firſt figures of this plate explain the Hip-joint; of which the chief parts are the ſocket, the head of the bone, the Capſule, and the Central Ligament of the joint.

THE Os Ilium is marked (*a*); the wriſt or ſpine of the Ilium is marked (*b*); the Poſterior Spinous Proceſſes of the Ilium (*c*); the Anterior Spinous Proceſſes are marked (*d*); the Spinous Proceſs of the Ischium, is marked (*e*); and the Tuberoſity of the Iſchium, the loweſt point of the Pelvis, upon which we ſit, is marked (*f*); the Ramus or leg of the Iſchium, joining the leg of the Pubis, is marked (*g*); the Thyroid hole (*h*); the Symphiſis Pubis (*i*); and the creſt of the Pubis (*k*); the ſhaft of the thigh bone is marked (*l*); the great Trochanter is marked (*m*); and the head of the bone is marked (7.)

The parts of the joint are marked with numbers, thus,

(1.) Is the bony margin of the Socket where it is formed by the Tuberoſity of the Os Iſchium; there the ſocket is very deep.

(2.) The Cartilage which encircles the brim of the ſocket, making it ſtill deeper and more ſecure.

(3.) A part of the circle of the ſocket oppoſite to the Thyroid hole, where the ſocket

is exceedingly ſhallow, or where rather the bony margin of the ſocket is wanting, and its place is ſupplied by a Ligamentous ſubſtance.

(4.) Is the Capſular Ligament of the hip, which is the ſtrongeſt in all the body. The thick cut edges of the Burſal Ligament are ſeen here; and the ligament is ſeen to come off at (*n*), from the Cartilaginous borders of the Acetabulum, being truely (as it is explained in the deſcription of this joint) a continuation of the Perichondrium, or membraneous covering of the Cartilage, conſiſting of two Cancellæ, one of which comes from the Internal Surface of the Socket, while the other comes from the outer ſurface of the bone, and both of them are condenſed into the Burſal Ligament.

(5.) Is a ſtrengthening of the General Capſule, or what may be called the Acceſſory Ligament, coming down from that little Bump which is named the INFERIOR ANTERIOR SPINOUS PROCESS of the Os Ilium; and this Acceſſory Ligament is beſt ſeen in figure ii. where the Capſule is preſerved entire, chiefly for the purpoſe of ſhowing this ſtrengthening or ſupplementary band.

(6.) Is the CENTRAL LIGAMENT, which is commonly called the round ligament, though it is truely of a Triangular form; riſing by a broader baſis at (6.) from the center of the ſocket, and implanted ſmall, neat, and round into that dimple which is ſeen in the drawings of the thigh bone, in the very center of its globular head; indeed the dimple made by the inſertion of this ligament is well ſeen here at (7.)

(8.) In the deep part of the ſocket, where this figure is placed, we ſee dimples irregularly hollow, which are the beds for lodging the MUCOUS DUCTS of the joint, or what has been called, though not truely, the SYNOVIAL GLAND; and at theſe hollows there are Frenulæ, or little tongues of the inner membrane of the ſocket, which hold theſe Mucous Ducts in their place; there are alſo little Frenulæ round the neck of the bone, eſpecially at its root, which conduct the Mucous Ducts, which lie there.

Theſe are the Frenulæ, or little ligaments, which I meant to enumerate in page 440.

by

by ſaying " that there are two Internal Ligaments belonging to this joint, *viz.* the " great INTERNAL CENTRAL, or round ligament as it is called, and theſe ſmaller " MUCOUS Ligaments."

(9.) Is the root of the Burſal Ligament, for it embraces not merely the head, but alſo the neck of the bone; and it is here explained how the Perioſteum *(o)*, which is ſeen torn up from the ſhaft of the thigh bone, goes off from the bone at *(g)*, in the form of Burſal Ligament, ſo that the Burſal Ligament and the Perioſteum are continuous, being different modifications of one membrane.

FIGURES III. AND IV.

ARE drawings of the outſide of the knee-joint, for explaining the General Capſule of the joint, and eſpecially for explaining the ſtrengthenings of the Capſule, which are known by the names of Lateral and Poſterior Ligaments.

FIGURE III. ſhows the inner ſide of the knee-joint, with the great Internal Lateral Ligament. *(a)* Marks the thigh bone; *(b)* the Tibia, and the letter is placed upon that bump, which receives the tendon of all the Extenſor Muſcles; *(c)* the Patella appearing through the tendinous expanſions which cover all the joint.

There is left here a part of the fleſhy belly of the Vaſtus Internus Muſcle (174.). This belly expands into the form of a thin tendinous faſcia, which goes over the common Capſule of the joint at *(d)*, to ſtrengthen it. It is at *(e)*, that the broad tendon of the Vaſtus Internus is inſerted into the Patella; and *(f)* is the ſtrong LIGAMENT of the PATELLA, which comes down from the pointed lower end of the Patella, which though it is called Ligament, is merely the thick and tough tendon by which all the muſcles, which extend the leg, as the RECTUS, VASTI, and CRURÆUS, are fixed into the knob *(b)*, upon the head of the Tibia. *(g)* Marks that margin of the head of the Tibia upon which the Semi-lunar Cartilage plays, and this ſharp edge

is

is ſeen here ſhining through the Capſule of the joint. (*i*) Marks the Capſule of the joint itſelf, thin and delicate at this point (by the ſide of the Patella). (*k* Marks the great INTERNAL LATERAL LIGAMENT, which is ſometimes named LIGAMENTUM LATUM INTERNUM, from its great breadth. It is not merely a ſtrengthening of the common Capſule, as the Lateral Ligaments of the elbow-joint are, but is a firm and diſtinct ligament, bright and gliſtening with ſilvery lights upon it like mother of pearl, of full three inches in length, very regular and formal, of a triangular ſhape, riſing by a broad baſis from the inner Condyle of the thigh bone, inſerted by a ſmaller and more pointed end into the head of the Tibia; and ſtretching down the bone, ſo as to mix gradually with the Perioſteum, and with the General Faſciæ or Tendinous Expanſions, which go out over the fore parts of the Tibia. And that it may be underſtood, how little this Ligament is connected with the Capſule, and how fairly it is entitled to the name of Lateral Ligament, I have diſſected it ſo as to thruſt a piece of Bougie (*l*), under the middle of the ligament, where it paſſes over the middle of the Capſule. Behind this at (*m*), there is a band of ligament lying, and in the direction of the greater ligament, which might almoſt be named as a leſſer Internal Lateral Ligament, but which is deſcribed only as a ſtrengthening of the greater one.

FIGURE IV. at the ſame time that it explains the Poſterior Ligaments, repreſents alſo the Lateral Ligaments on the outer ſide of the joint. (*a*) Marks the thigh bone; (*b*) the Tibia; (*n*) the Fibula; (*i*) the Burſal Ligament of the joint, ſo cut as to expoſe the inner Condyle of the thigh bone, naked and ſhining.

This Burſal Ligament is ſtrengthened every where behind, by irregular ſtrings of ligament paſſing over it in all directions, but chiefly oblique, and one of theſe oblique Faſciculi or bands is generally ſo very ſtrong, as to deſerve the name of Ligamentum Poſticum. So I have marked the irregular Faſciculi (*o*), and I have marked the more formal Ligament the Ligamentum Poſticum Winſlowii (*p*).

The

The great LATERAL LIGAMENT on the outer ſide of the knee-joint is marked (*q*). It is here ſeen, that the EXTERNAL LATERAL LIGAMENT is not ſo flat as the Internal one, that it does not lie ſo fairly as the Internal one upon the ſide of the joint, but that it inclines a little towards the back part; and it is ſeen in the drawing as I have explained it in the book, that the proper External Ligament, the LIGAMENTUM LATERALE EXTERNUM LONGUM (*q*), is a large and ſtrong ligament, proceeding from the outer Condyle of the thigh bone, and fixed into the head of the Fibula; but that the LIGAMENTUM EXTERNUM LATERALE BREVIUS vel MINUS (*r*), has not the true form of a Lateral Ligament coming down from the Condyle, but is a mere ſtrengthening or outward band of the Capſule, riſing upwards from the knob of the Fibula.

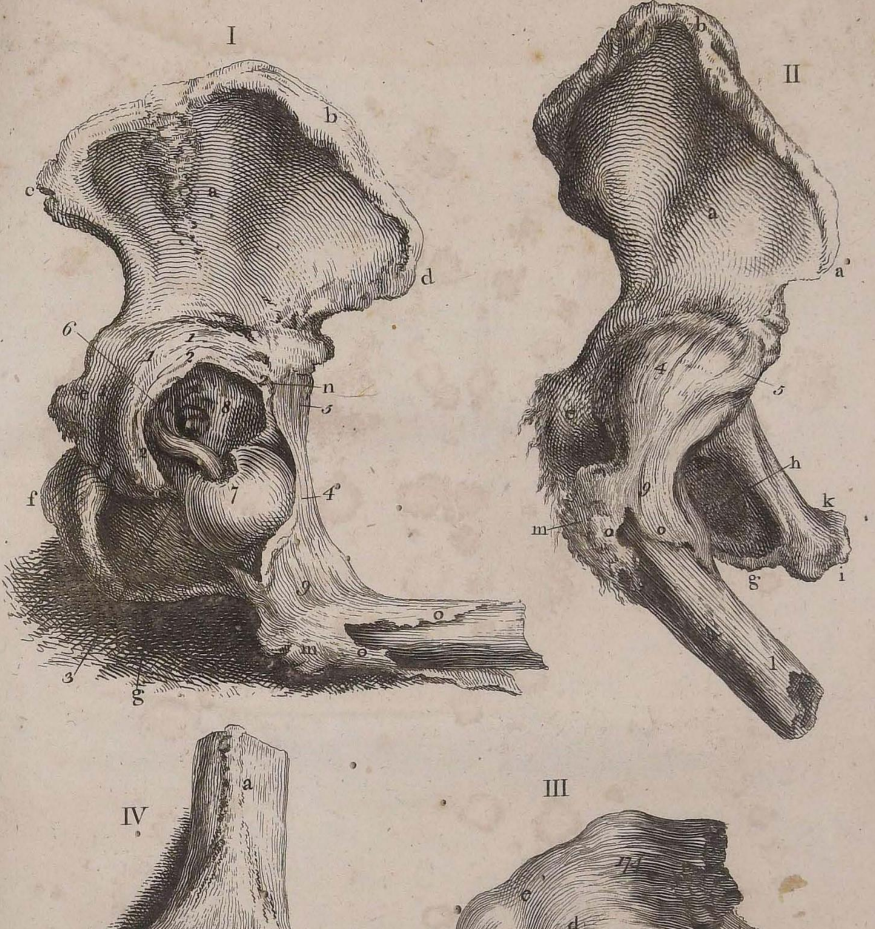
So that in theſe two drawings, iii. and iv. are ſeen, all the chief parts on the outſide of the knee-joint.

1. The bones as, (*a*) the thigh bone; (*b*) the Tibia; (*c*) the Rotula or Patella; (*m*) the Fibula; and (*f*) the ſtrong Ligament of the Patella, a part which is properly arranged with the bones.

2. There is the Capſule and parts connected with it, as (*i*) the thin membrane of the Capſule itſelf; (*d*) the Faſcia or expanding tendon of the Vaſtus Internus ſpreading over it, to ſtrengthen it.

3. The Lateral and Poſterior Ligaments, as (*k*) the INTERNAL LATERAL LIGAMENT, flat, ſtrong, and almoſt triangular; with a ſmall ligament (*s*) to ſtrengthen it; (*q*) the great EXTERNAL LATERAL LIGAMENT rounder and more oblique; which (in its turn alſo) is ſtrengthened by a ſmaller ligament (*r*). And Laſtly, the ſtrengthenings on the back part of the joint, which are irregular at (*o*), and which form ſometimes a more regular Ligament at (*p*), the LIGAMENTUM POSTICUM WINSLOWII.

This Anatomy of the knee-joint is continued in the two firſt figures of next plate.



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J Beugo Sculp

PLATE III.

This Plate explains the Text Book, from Page 443, to Page 452.

THE Anatomy of the knee-joint is continued in this plate. It explains the internal parts, the knowledge of which is more valuable than of the external parts, in proportion as internal diſeaſes of this joint are more frequent than luxations, which never happen except in thoſe terrible injuries, where all the ſoft parts belonging to the joint, are entirely torn up by the roots, ſo that the limb cannot be ſaved. The chief parts to be obſerved within the joint are the fat, and Mucous Membranes, which lubricate the joint, the Ligaments or Frenulæ, which order and regulate the motions of theſe fatty maſſes and fringes., the Semi-lunar Cartilages which, like friction-wheels facilitate the motions of the joint; and Laſtly, the great Crucial Ligaments by which the joint is ſtrengthened within, the Crucial Ligaments alone being ſtronger than the whole of thoſe Ligaments which are to be ſeen on the outſide of the joint.

1. The Fat.

THE fat which is for lubricating the knee-joint, though it is not entirely confined to the circle of the Patella, yet it chiefly ſurrounds it; and with the fat there are

 many

many fringes of the Mucous Ducts; much fat is found at each ſide of the Patella at (*a a*), but the chief collection is at the lower part of the Patella. At (*b*) figure i. this fat appears peeping out from under that ligament, by which its motions are regulated; but at (*b*) in figure ii. the ligament is cut away, and all the fat is freely ſeen.

This collection of fat and Mucous Ducts makes a riſing upon each ſide of the Patella, marked with a deep, and ſmooth ſulcus round the edge of the bone; and this hanging of the fat on each ſide of the Patella, is named by WEIDBRIGHT the Ligamentum Alare Majus, where it hangs in the inner ſide of the Rotula; and Ligamentum Alare Minus, where it projects leſs at the outſide of the Rotula; (*Vid.* (*a a*) figure i.) But all this is quite arbitrary; theſe are not ligaments, nor do they tie any other part; they are but looſer foldings of the inner coat of the Capſule, where it riſes over the inner ſurface of the Patella, and where it holds larger globes of fat, or conducts the fringes of the Mucous Follicules.

2. The MUCOUS LIGAMENT.

Theſe bundles of fat are tied by a true ligament (*c*), which properly belongs to them. But to underſtand this ligament and its names, it muſt be obſerved, that the two Lunar Cartilages are moveable; that the two horns of the Lunar Cartilages are tacked together by a little Tranſverſe Ligament; and that this Tranſverſe Ligament is again connected with the little maſs of fat, which lies under the lower border of the Patella; and laſtly, it is to be remembered, that theſe fatty bundles are chiefly intended for conducting and defending the Mucous Ducts or fringes. Now the ligament (*c*) figure i. which regulates at once the poſitions of all theſe parts in the various motions of the joints, has been named "Ligamentum Mucoſum," by Veſalius, he referring it to the Mucous Membrane; it is named "the Ligament moving the Semi-lunar Cartilages" by Cheſſelden; it is named, "Ligamentum Internum "Longitudinale,"

"Longitudinale" by Walther, becaufe of its running down exactly in the middle of the joint; it is named not unfrequently "Ligamentum Gracile," from its delicacy. Weidbright feems to call it (in one place at leaft) "Frenulum Pinguedinis "Glandulofæ;" and he concludes with a queftion, whether this in place of being a diftinct Ligament be not rather a continuation of his two Aliform Ligaments.

But the nature of this ligament is very diftinct. It is a regular ligament of a very conftant form, and having very curious ufes; it is a ligament tolerably thick, but of a foft and membranous nature. It is fmall and pointed above as at (*d*), where it rifes from the interftice betwixt the two condyles of the thigh bone; it gradually broadens downwards, fo as to acquire rather a triangular form, terminating by a broad bafe near the root of the patella at (*e e*). It lies in the fore part, or rather perhaps in the centre of the joint in the middle behind the patella, and before the Crucial Ligaments. Its bafis fpreads out into two limbs (*e e*); one going to the right fide, and the other to the left, and this forking of it is named by Walther LIGAMENTUM TRANSVERSUM SEMICIRCULARE *; calling the upper and fmaller part of this ligament the Longitudinal Ligament; while he names the bafis and broader part of the ligament the Tranfverfe Ligament, and it is under this root or tranfverfe part of the mucous ligament that the fat which it confines is feen peeping out at (*b*).

This ligament then, (which in place of dividing thus curioufly into Longitudinal and Tranfverfe or Alar ligaments, may be defcribed under the general title of Mucous Ligament), is of confiderable fize, being almoft of the thicknefs of the little finger, and is the part that is feen when the joint is firft opened; not firm and hard like thofe ligaments which tie the bones, but foft, delicate, and membranous, fit for its office of conducting the mucous ducts in fafety, and regulating the motions of the fatty bundles. It is fmall at (*d*), where it comes off from the great Sulcus betwixt the condyles.

* So Walther names as Tranfverfe Ligament thofe parts which Weidbright marks by the names of Ligamentum Alare Majus and Minus.

dyles. It grows broad at its root, being there ſo large as to fill up all the empty ſpace in the joint. It aſſumes at its lower part a triangular or priſmatic form, with one flat ſide directly forwards, and the other angle of the priſm looking backwards in the joint, and covering the crucial ligaments which lie in the back part of the cavity. After enlarging at its baſis, it degenerates into a ſoft mucous or membranous covering for the fat and mucous glands; thus it is connected at its root with the lower edge of the patella; with the fat and mucous fringes, and with the fore horns of the Semilunar Cartilages. So that this ligament moves in every motion of the joint, as the thigh-bone from which it riſes moves, it is moved the more from its connection with the patella, and as this ligament moves along with the patella, it in its turn moves the Semilunar Cartilages and the bundles of fat, and keeps them fixed, or draws them forwards; for were the fat permitted to move backwards, it would be bruiſed directly betwixt the bones with a force that would deſtroy it; and thus the mucous ducts not only by the elaſticity of the fat which ſurrounds them, ſtart out from betwixt the bones when they preſs too cloſely; but the fat together with all the glands which belong to it is ſo held forward by this mucous ligament as to lie always in the free and open part of the joint.

This ligament was thought by the ancients to be ſometimes wanting, though this cannot be true of a part ſo eſſential to the ſound conſtitution and free motions of the joint. It is believed by ſome, that it may be torn in ſudden and violent bendings of the knee; it ſurely is the part the moſt ſubject to diſeaſe, ſince we find it in ulcerated joints quite coroded. It is plain that this part muſt be moſt peculiarly ſubject to inflame, ſince it is continually working in every motion of the joint; it is not only delicate in itſelf, but is connected with all the more delicate parts; for the inner membrane of the capſule is continuous with this Mucous Ligament; the fat that ſurrounds the patella is continuous with it; it conducts the fringes or ducts of the chief mucous glands; it is itſelf a ſecreting ſurface, and the moveable or Semilunar Cartilages

lages are tied to it; by all which circumſtances it becomes too important in the œconomy and diſeaſes of this delicate joint to be paſſed ſlightly over.

3. The Moveable Cartilages.

The two Moveable Cartilages are not ſeen in Fig. i. becauſe the mucous ligament which covers them is entire. In Fig. ii. they are marked (*m m*). The letters (*m m*) touch the outer edges of the cartilages, where their outer margins adhere to the inner ſurface of the capſule.

The parts and connexions of theſe cartilages are better explained in Fig. iii. where (*m m*) ſtill mark the outer circles which adhere to the inner ſurface of the capſule. The letters (*n n*) mark the thinner edges, and ſhow the ſpace in the center of each cartilage which holds the condyle of the thigh-bone. (*p p*) Mark the two poſterior horns and the little tags of ligament by which they are tied to the crucial ligaments behind. And (*q q*) mark the two anterior horns, and the little tags of ligament by which they are tied to the root of the mucous ligament before. And (*r*) marks a little croſs ligament by which the two anterior horns are connected with each other, and which is named Ligamentum Transversale Commune.

4. The Crucial Ligaments

Are well ſeen in Fig. ii. where (*c*) marks the part from which the pointed origin of the mucous ligament was cut away. And by cutting away that ligament, the Crucial Ligaments which, in Fig. i. are covered by the mucous or central ligaments, are in this drawing brought into view

The Crucial Ligaments lie both in the back part of the joint, and touch that part of the Capſule, which lies in the Ham; but one of them (*s*) lies behind, whence it is called the Poſterior Ligament, and the other (*t*) though it lies flat upon the Poſterior Ligament,

Ligament, and in contact with it; yet being before it, is named the Anterior Ligament.

The reafon of this Anterior Ligament being reprefented as coming fo far forwards as to touch in a manner the root of the Patella, is plainly this; that to take a fure hold of the Tibia it does actually rife over the tubercle in the center of the joint, and goes out flat over all the face of the joint, and the reafon of the Pofterior Ligament feeming to follow this one, and to come alfo far forwards in the joint, is, that the ligaments of the horns of the Lunar Cartilages climb upon the fore-part of the Pofterior Ligament, and fo it is more properly the Ligament of the Lunar Cartilage that is feen at (*u*), while the head only of the Pofterior Crucial Ligament is feen at (*s*).—— But both the true direction and extent of thefe ligaments and their true office will be better underftood by the following plan; for there is this one thing very fingular in the effect of thefe ligaments, that it is not the Pofterior Ligament that checks the leg and prevents it going too far forwards; nor the Anterior Ligament that prevents it being ftrained backwards, but quite the reverfe; for the Pofterior Ligament is moft ftretched when the knee is bended; the Anterior Ligament again is ftretched when the leg is extended.

FIGURE I. Shows the leg extended.

FIGURE II. Shows the knee bent.

In Figure 1ft, (*a*) is the Thigh-bone; (*b*) the Inner Condyle; (*c*) the Outer Condyle; (*d*) the head of the Tibia; (*e*) the knob in the center of the Knee-joint; and (1) is the Anterior Ligament arifing from the Outer Condyle, (viz. the one neareft the eye in this drawing), and going out over the fore-part of the Tibia, and inferted properly into that hollow (*f*), which receives the Condyle; (2) is the Pofterior Ligament, rifing rather from the center of the Thigh-bone betwixt the Condyles, and going down over the back-part of the Tibia at (*g*).

And in figure ii. it is plain by the change of the poſition of the bones, that when the knee is bent, the Poſterior Ligament (2.) is ſtretched, and the Anterior (1.) relaxed. And of courſe, as in figure i. that when the leg is extended, the Anterior Ligament (1.) will be ſtretched, and the Poſterior (2.) relaxed.

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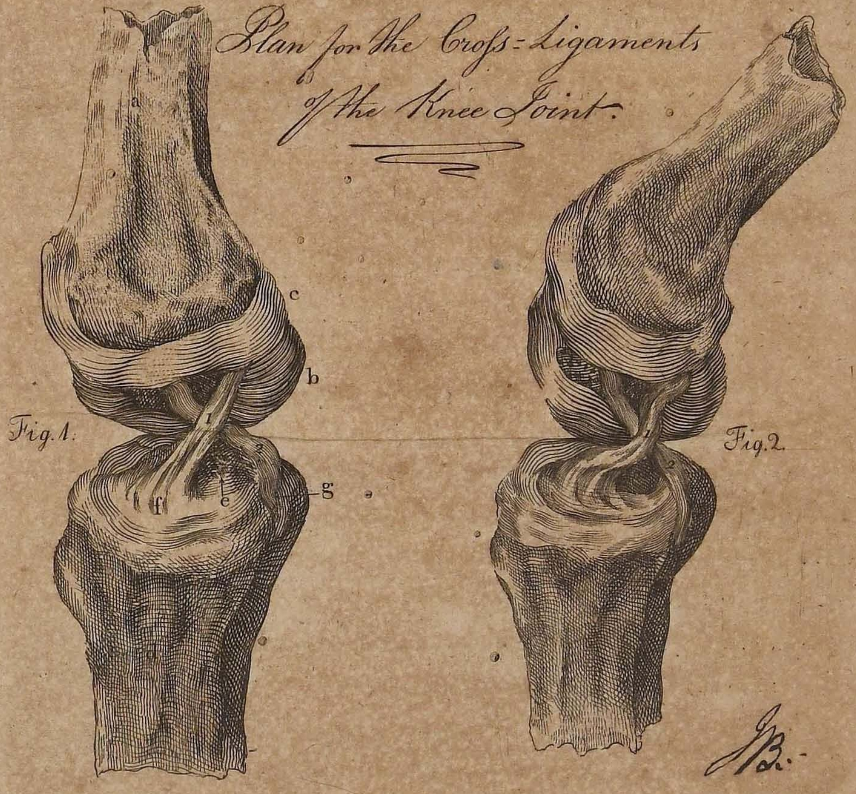


In theſe three drawings, all the internal parts of the knee-joint are explained.

1. The FAT which is collected chiefly round the Patella, which perhaps does not exude nor mix with the fluid of the joint, but ſerves rather by its Lubricity and Elaſtic nature, to conduct and defend the fringes or Mucous Ducts.

2. The MUCOUS LIGAMENT, which is the firſt part that is ſeen upon opening the joint; which lies in the center of the joint; is of a ſoft and mucous nature; conducts many of the Mucous Fringes; and which, deſcending from the middle of the thigh bone betwixt the Condyles, is attached to the lower edge of the Patella, and to the Semi-lunar Ligaments, and ſo it moves along with the Patella, and moves in its turn the Cartilages and the fat. It regulates the motions of the Cartilages, and it draws forwards the fat, preventing it going backwards, ſo as to be bruiſed betwixt the bones.

3. The SEMI-LUNAR CARTILAGES, which are like the labels which are put round the neck of a wine flaſk. They are tied at the horns by ligaments, as the label is hung by its chain; lie flat upon the Tibia, to facilitate its motions, and enable, at the ſame time, the Condyles of the thigh bone to change their centers of motion, according to the various poſtures of the joint.

4. The CROSS LIGAMENTS, which are very thick, and ſtrong, lie chiefly in the back part of the joint, and by their going the one over the face of the Tibia, and the other down along the back of the bone, they limit both its motions, the one checking it in too violent bendings of the knee, the other limiting its extenſions. So that the motions forwards and backwards are limited by theſe Croſs Ligaments within the joint, while it is ſecured from irregular Lateral motions by the ſtrong Lateral Ligaments without.

FIGURES

FIGURES IV. AND V.

EXPLAIN the Ligaments of the ancle joint, and of the foot. All the great Ligaments belonging to the ancle joint, or to the Tarſal Bones are drawn in figure iv. and in figure V. are ſeen the two great ligaments lying in the ſole of the foot.

FIGURE IV.

THE Ligaments belonging to the ancle joint are theſe,

(1.) A ſtrong Ligament tying the Fibula to the Tibia. It is large and very ſtrong; commonly it is divided, as here, into two, ſometimes into three ſlips; ſometimes they all adhere. It is named the LIGAMENTUM ANTICUM SUPERIUS. There is on the back part of the Fibula a ligamentous membrane, which is like this one, and is named Ligamentum Fibulae Poſticum Superius.

Theſe ligaments connect the Tibia and Fibula ſo firmly to each other, that they are as one bone with two proceſſes, viz. the inner and outer ancles.

(2.) Is the MIDDLE PERPENDICULAR LIGAMENT, a very ſtrong ligament, which deſcends directly from the point of the outer ancle, to tie it firmly to the ſide of the Os Calcis. There are three ligaments tying the outer ancle to the foot; viz. firſt, this middle one; ſecond, the anterior one; and, third, one behind the joint, a poſterior ligament, which is not ſeen. This Middle Perpendicular Ligament, ſo named from its poſition, deſcends directly from the very point of the outer ancle, and it is implanted into the ſide of the heel bone. It holds the ancle from yielding to one ſide, and from bending too much; aſſiſting rather the poſterior ligament than the anterior one. It lies cloſe upon the Capſule, and ſtrengthens it; while the tendons of the Peronaei Muſcles glide and rub acroſs it.

 (3.) The

(3.) The ANTERIOR LIGAMENT of the outer ancle is for tying the outer ancle to the Aſtragalus, as the perpendicular one ties it to the heel bone. It goes ſometimes in two diſtinct bands, as repreſented here. Very often they are ſcarcely divided; it appearing as one ſtrong uniform ligament, white and gliſtening, paſſing obliquely forwards from the loweſt point of the Fibula to the neck of the Aſtragalus.

Theſe three are the chief ligaments of the ancle; and the order of ligaments which come next, is of thoſe which tie the Aſtragalus to the Os Calcis and to the Os Naviculare.

1ſt, (*a*) Is a ligament, or rather two or three ligaments, which croſs the great hole, which, in the drawings of the bones of the Tarſus, is marked with a pencil thruſt up through it. This is called the Cavitas Sinuoſa; and ſo theſe irregular ligaments are named Ligamenta, or APARATUS LIGAMENTOSUS CAVITATIS SINUOSÆ. They are merely irregular ligaments, lying deep in this hollow, and tying the Aſtragalus to the Os Calcis.

2d, (*b*) Is a ligament which ties the Aſtragalus to the Os Naviculare. It begins at the neck of the Aſtragalus; touches the Os Naviculare; goes ſtill forwards, and ſpreads a little upon the cuneiform bones; and, from this expanding form, is named LIGAMENTUM LATUM. Though there are ſeveral bands of ligament on the inner ſide, they are not ſo particular, nor ſo formal in their ſhapes or uſes, as to have any appropriated name.

3d, (*c*) There are ligaments tying the Os Calcis, in its turn, to the Os Naviculare and to the Os Cuboides. The letter (*c*) is placed upon that prominent point of the Os Calcis whence thoſe ligaments go off; and they go ſomewhat in a ſtar-like form, juſt as I have drawn them, and not very diſtinct. And thoſe bands which go upwards tie the Os Calcis to the Os Naviculare;—thoſe which go downwards tie it to the Os Cuboides; for the chief articulation of the heel-bone is with the Os Cuboides.

4th, (*d*) There goes a little ſlip of ligament, not much noticed from this ſame point of the

the heel-bone, to that part (*e*) of the metatarſal bone of the little toe, which is very ſharp and prominent; and is in all poſitions and drawings the moſt remarkable point in the foot.

The ligaments again, which tie the ſeveral bones of the Tarſus, as the cuboid and cuneiform bones, together, are flat, ſhining, ſtar-like, and very numerous; and, from their lying upon the back of the foot, are named LIGAMENTA PLANA DORSALIA. They are marked (*rrr*); and are too irregular in their form, and too general in their uſes, to need any more accurate indication; for theſe are the ligaments which are ſo croſſed and interwoven, "that they form what we may call a web of ligaments, conſiſting of ſhining and ſtar-like bundles," of a cartilaginous hardneſs, adhering cloſely to the whole ſurface, and paſſing from bone to bone over all the ſurface of the foot. (*t*) Is the Ligamentum Longum, which is marked 3. in the 5th drawing, and is explained in the letter preſs of that figure.

The ligaments which tie together the Tarſus and Metatarſus are alſo ſeen here, at the roots of the metatarſal bones. There are lateral ligaments which tie each metatarſal bone to the one next it. But the ligaments which appear chiefly upon this upper ſurface, are a continuation of the irregular web of ligament belonging to the Tarſal bones; and as this web takes particular ſhapes in paſſing along to the ſeveral heads of the Metatarſal bones, theſe are beſt named, in general terms, LIGAMENTA DORSALIA, the Dorſal Ligaments of the Metatarſal bones; and they are marked (*sss*).

IN FIGURE V.

THE Ancle joint is ſeen opened. The Tibia and Fibula (*a* & *b*) are turned backwards. Their ſtrong ligament (*c*), which binds them together, is ſeen; the Capſule, which is clean diſſected, is marked (*d*), which ſhows its cut edges. (*e*) Shows that

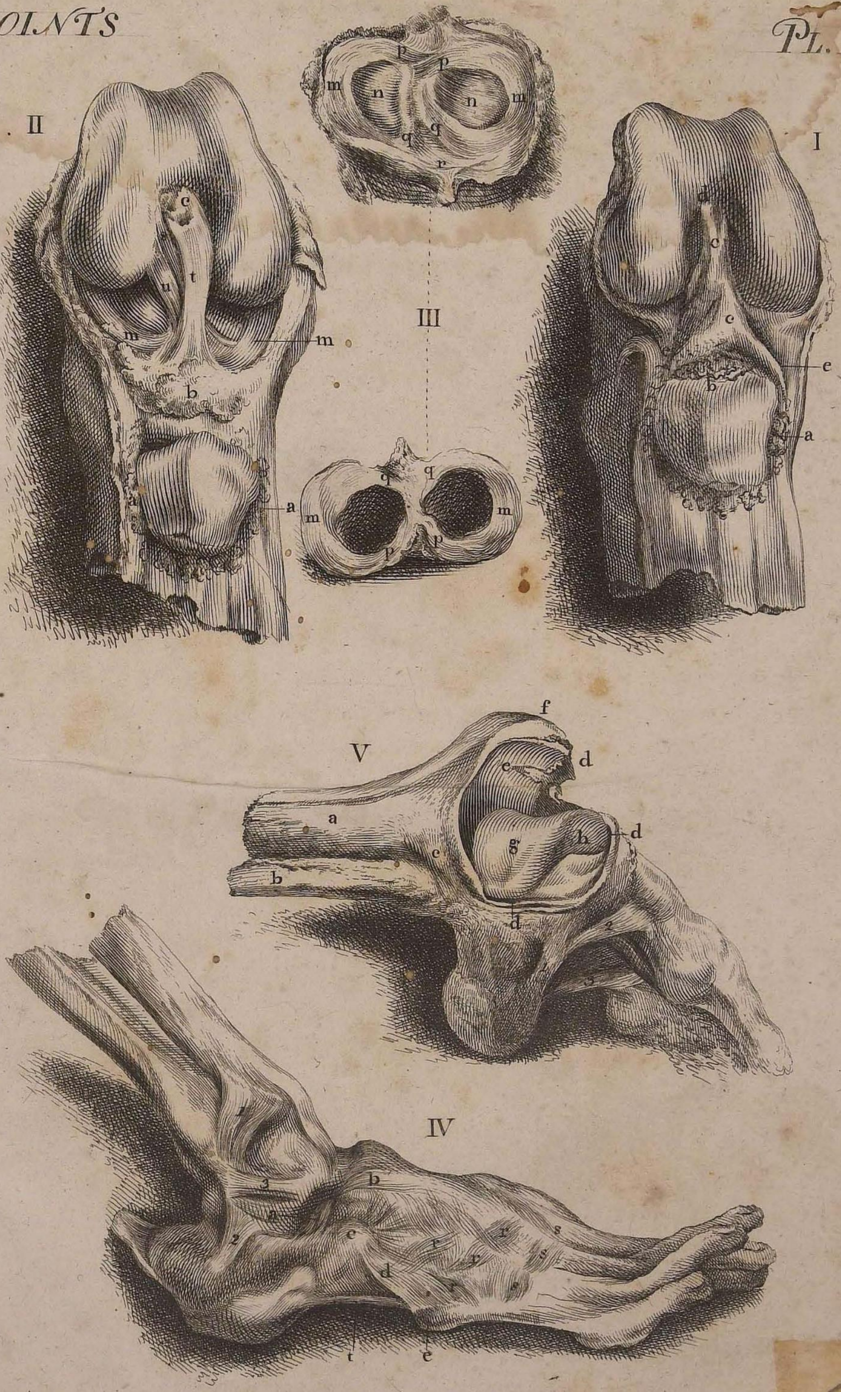
that it is a reflection of the Capſule that lines the cavity of the joint; and the proceſs (*f*) of the outer ancle being turned back, the great head, or the cartilaginous pulley of the Aſtragalus (*g*), is expoſed covered with its ſmooth cartilage. The flat ſide of the Aſtragalus within the joint is alſo ſeen at (*b*), where it was embraced by the inner ancle or proceſs of the Tibia (*f*). There is but one ligament to be noticed in this drawing; for

1ſt, Is a band very ſtrong indeed, which paſſes from the Aſtragalus to the Os Calcis. It has, as is ſeen here, the diſtinct form of a ligament. It ties the Aſtragalus and Os Calcis ſtrongly together; and ſo it has alſo the office as well as the mere form of a ligament. But it often happens, that the tendon of the Flexor Pollicis runs through this ring; therefore its office as a ligament (which it truly is) is very little noticed.

2d, There is a ligament of the inner ancle, like the perpendicular ligament of the outer ancle. It is of a triangular form; and is hence named Ligamentum Deltoides. A proceſs of this ligament binds down the Tendons of the Tibialis Poſticus, and of the common flexor of the toes. Therefore the ligament marked (2), at the ſame time that it binds the bones of the foot together, holds down the flexor tendons.

3d, The figure (3) marks the great ligament of the ſole of the foot. It proceeds ſmaller from the point of the heel bone; it enlarges towards its inſertion into the Os Cuboides. It binds theſe two bones particularly; and, by binding them, it ſupports very powerfully the whole arch of the foot; and this ligament, which is alſo very thick and ſtrong, is of ſuch particular length, (the longeſt ligament of all the Tarſus), that it is called Ligamentum Calcis Longius. It is ſeen under the edge of the foot in the drawing, figure iv. marked (*t*).

But the trueſt ſupport of any joint is not its ligaments ſo much as the muſcles which bend it; and it is thus with all the flexor muſcles which paſs under this great arch of the foot—How could the arch of the foot be ſuſtained, by ligaments of any kind, under



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J Beugo

the whole weight of the body, and its exertions? Surely it could not be ſuſtained otherwiſe than by the ſtrong action of the Tibialis Poſticus and the flexor muſcles of the toes; and when a man ſtands under a burden, as well as when he walks, this arch is ſubſtained by the continual action of thoſe muſcles the tendons of which paſs under the arch.

FINIS.